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# PHILOSOPHY TODAY

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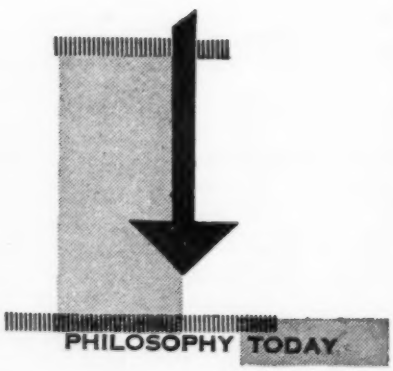



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A quarterly survey of trends and research in philosophy directed to the interests of scholars and teachers within the Christian tradition.

# the ONE voice of SCIENCE and the MANY voices of PHILOSOPHY

• • • • •

*by Louis De Raeymaeker*

WE ARE ACCUSTOMED TO distinguish clearly between natural science and philosophy. This has not always been the case. The distinction came into being only in our own generation, and it took centuries before we began to clarify the situation.

We do not wish to investigate at the moment why philosophy and natural science tended to blend with each other in antiquity, nor why and how they are distinct today in their basis and methods as well as in the significance and range of their results. We shall be satisfied with the simple observation that such a distinction is made (between philosophy and science as they have evolved in the course of time), and we should like to emphasize that we consider this distinction necessary.

It is our intention first to make some observations concerning the attitude and standpoint of both scientists and philosophers, and then try to show something of the hidden harmony behind all the dissonances that we hear in philosophy.

Let us turn our attention first of all to the following fact: In philosophic treatises we regularly find quotations from other writings as well as references to works that are often of great antiquity. Perhaps this is an indication that philosophic thought in a certain way takes its stamp from history.

xxxv Jahrgang, Heft I 1960, pp. 1-27.

SCHOLASTIK

This is by no means the case in the exact sciences. No one expects of the mathematician a treatise bristling with citations. Nor will the physicist in his laboratory work display much interest in what the Greeks or Arabs of antiquity or the Middle Ages thought concerning his research problem. We do not wish to give the impression that history is entirely without interest for natural science.

But while it is true that science shows an undeniable historical interest — as well as a certain philosophical interest (especially in the critique of knowledge) — yet the fact remains that history is not absolutely necessary for the further development of science. It is rare to find a scientific specialist having at his command a precise historical knowledge of his discipline.

We may add that the scientist has no fear whatsoever of admitting his ignorance in these matters, while no philosopher is happy to acknowledge such a shortcoming in questions of philosophical history, for he is convinced that such lack of knowledge is a great disadvantage to philosophy. For this reason every study program in philosophy makes place for the history of philosophy, often more than for the philosophical disciplines themselves. By way of contrast a program of studies in mathematics or physics normally includes no historical course or at most an optional one.

We should like to call attention to a second fact: a philosopher of our time can get about in the old philosophical texts without difficulty. Language apart, it is no harder for him to study a passage from Plato than one from Heidegger. He finds no more difficulty in understanding the writings of Plotinus that those of Hegel. He is as well able to interpret St. Thomas as Edmund Husserl.

The picture is quite different in natural science. To read a tract on natural science from antiquity or the Middle Ages is a strange experience: one enters another world. And even if the reader studies enough to understand the original meaning, he remains convinced that modern and ancient science are separated by a hopeless chasm.

Finally a third important fact should be pointed out: it is the present-day relevancy that endures in every genuine philosophy, no matter to what age or to what people it may belong. Especially under this aspect philosophy and natural science invite comparison.

With the progress of science what was correct up to a particular moment is allowed to fade into the past; it is submerged and superseded once and for all. The science that is disinterred from the past is without force, is no longer productive, no longer up to date. Its significance lies entirely on the "historical" plane. To keep up with the current of a science it is necessary and sufficient to master the latest findings of research. Even when the memory of scientists of past centuries is preserved from oblivion because of laws or institutes or streets or plazas named after them, it is the name only not their work that lives on. The writings of scientists of yore are seldom consulted no matter how important they may have been in their time. Their present-day scientific influence is practically nought. They exist only for and in history; from the scientific standpoint they are dead.

How different is the lot of philosophers. No matter how important their followers may be, their own writings are read on and on with fruitful results. How many philosophic works have been published since the time of the Greeks! But what philosopher can dispense himself from reading Plotinus, the Stoics, Aristotle, or Plato, not forgetting the

pre-Socratics? He not only reads them but immerses himself in the serious study of their writings. Surely no natural scientist makes a comparable study of the scientific writings of antiquity.

This has led to the notion of a *Philosophia perennis*, in which the philosophers of past centuries are believed to have taken part, not only because of the effect which they had in their lifetime in enriching the philosophic thought of their own era, but also, and especially, because to the present day they have not ceased to influence the development of philosophy, thanks to their perennial power of stimulating the minds of men.

Naturally the idea of a perennial philosophy cannot refer to a single system constructed according to a plan set up at the beginning of our civilization and worked out by successive thinkers in the course of centuries. Even less do we believe that philosophy has developed in the course of time as an organism grows and matures by dint of a *telos* within it. This would be a naive simplification doing violence to the facts. It could never be reconciled with the contradictions among thinkers whose interpretations stand poles apart, for how could these thinkers have cooperated in building a perennial philosophy thus conceived?

## WHAT IS THE MEANING OF THIS?

We may make the preliminary observation that among the many stars that shine in the philosophic heavens some are of the first magnitude while the majority shine with a borrowed light. We shall consider only the great luminous suns and pass over the others in the interest of simplicity. The real creative geniuses are relatively rare in philosophy as elsewhere. From Greek antiquity through the Arabian and Christian Middle Ages to our time we may count perhaps a few dozen. Henri Gouhier's remark is to the point: "Genius is rare, but luckily talent fills out the empty years."

Philosophy appears to us as a symposium inaugurated some twenty-five centuries ago and continuing to our own time. The great thinkers of all ages have taken part in it and still take part in it. Thinkers of less than gigantic stature play the role of spectators to some extent. They are the public, and their contribution can be very real and significant.

There is an effective cohesion in this symposium which is unmistakable. As time moved on, new generations of intellectuals took their places at this philosophical banquet. But they did so by taking thought of the presence of their predecessors, by taking up and explaining their views, either to accept or to reject them. These new forces reenergized philosophy and threw new light on old problems and on the means of solving them. The ancients were never completely dislodged. On the contrary, far removed and condemned to silence, they have continued to make their voices heard as before. Gabriel Marcel has pointed out that the most important works lead a kind of posthumous life. When circumstances change, these works suddenly appear in a new light and acquire a hitherto unsuspected meaning. They seem to possess an unlimited richness and excite ever-growing wonder. This is as true of the classical works of philosophy as of works of art.

In the case of an average philosophical publication the bottom can be scoured at the first reading and it is

superfluous to return to it, but not the works of the masters. They reach to unfathomable depths and are read again and again to advantage. And in fact the works that have become classic in philosophy are read and commented upon without ceasing. Men will never stop studying Plato, Aristotle, Augustine, Thomas Aquinas, Descartes, Kant, Hegel, and all the other intellectual giants, and new works about them are constantly coming forward. Here we have the reason for the formation of schools and philosophical traditions.

An unusual gathering this, on one side the living thinkers of our time, on the other the wise men, who, though long dead, have never ceased to exert a real influence thanks to the posthumous life of their works, all seated together at the same philosophical symposium. The interchange of ideas in philosophy takes place not only among contemporaries but among philosophers of all ages. Young and old form a symphony of voices, and everyone has his part in this philosophical polyphony.

How can these facts be explained and justified? Let us at least try to be aware of the apparently paradoxical situation. For centuries it has been taken for granted that philosophers cannot agree either on proposed solutions or on the terms in which the problems are to be stated. This may be correct in a sense. Nevertheless the importance of philosophic differences of opinion should not be exaggerated. We do not want to forget what we have already observed, that philosophers are engaged in dialogue. It is conceded as Mortimer Adler of Chicago has said, that often the dialogue is only a series of monologues running parallel to each other, and that under these conditions any exchange of opinion is illusory because no contact has really been made. But this also should not be exaggerated. For there is often a real meeting of minds and fruitful discussion. Mr. Adler himself made his observation only to emphasize how necessary it is to find effective means to bring about such contact, which he ultimately considers entirely possible. But if it is true that the philosophers with their interminable discussions finally create the atmosphere that every dialogue presupposes, then it is also necessary that there be a meeting on a level common to all. One cannot simply say, therefore, that philosophers never arrive at agreement on any point, even though it may seem so at first sight.

Do philosophers agree or not? There seems to be no middle position here between yes and no. But perhaps it would be wrong to jump to a conclusion, for in a sense there may be a third possibility. A too uncompromising position in this case would be like the too brusk denial of evil. We must preserve the nuances. The solution I should like to propose is based on the *personal aspects* that characterize all philosophy.

## PERSONAL PHILOSOPHY

Let us recall that by definition the *person* possesses singular and immediate meaning and value. This is true of the thinker as well as the artist, or for that matter the man in the street. There can be but one Demosthenes, one Alexander, Dante, Rubens, Bach, or Mozart. To believe that a man would be born who would match one of the above to the last hair is senseless. The person is singular in its very being.

If the concrete life-orientation of a man, his starting plan, is stamped with the image of the person, and if this is

impressed upon every work of art, then it is impressed equally on every philosophic work. This is the point we wished to make. But we should like to add at once that this viewpoint has nothing to do with philosophical subjectivism. But if this suggestion has any merit, then we should no longer wonder that there are diverse philosophical interpretations or become excited about them. We should understand that the various systems, each of which corresponds to a personal inspiration, do not entirely do away with or replace one another.

Here we touch upon a fundamental distinction between philosophy and natural science. Whoever overlooks it cannot form an adequate picture of philosophy.

As the natural sciences have developed in the course of history, they investigate reality from a viewpoint that is in the truest sense of the word "abstract," or if you prefer, "from the standpoint of Sirius." The result is that its point of view is not only universal but also unified, exactly the same for one and all. And in the realm of science it is this viewpoint which stands out; and the results, at least, prove its fruitfulness and its correctness.

Philosophy is distinct from natural science; it has its own point of view. But what is that point of view? Philosophy strives to explain reality considered inwardly and as a whole. It cannot be satisfied, therefore, with an abstract viewpoint; for it ought to consider and understand reality as such, that is, things and persons in their concrete being and value. Therefore philosophy must base itself from the very beginning on a fundamental experience which embraces the whole without any exception whatsoever, on a transcendental experience in the scholastic sense. Such an act of knowing, since it is universal, is not exhausted in a univocal concept, for it cannot be the result of an abstraction properly so called; otherwise it would cease to be all-embracing and transcendental. Thus philosophy is built upon a fundamental experience that supports it, nourishes it, inspires it, and gives it direction, and from which it cannot separate itself without prejudice to its life force.

It is unquestionably clear that such an experience bears the stamp of the personal pecularities of the subject whose act it is, to such an extent that the philosophical thought activity that springs from it is internally stamped by it. For this reason such an experience will be the richer and fuller and deeper as the personality to which it belongs is more outstanding and important.

We shall limit ourselves to showing in a somewhat summary fashion how one and the same fact is not interpreted in the same way by different persons, especially when the fundamental value content of a fact has impressed the one person but not the other. The reason for this is that the powers of penetration and the knowing faculty of different personalities is by no means the same. Ultimately a certain touch, and intellectual dexterity and the force of personality are at work here.

In a philosophical system two things are to be observed above all: first, the richness and variety of meaning which the personal experience has brought out into the light of day; second, the manner in which the parts are put into order, the logical deduction, the reduction of concepts, the abstract principles, so as to lead to a solidly constructed system. Both elements are absolutely necessary for a fully developed philosophical system. Naturally it seems to us that the final worth of a doctrinal structure depends more on the first-named element than on the second. We shall be content merely to point this

out as something self-evident, important enough not to be overlooked. It is a commonplace that many a lecturer, author, or professor has important things to say, and often says them without bothering much about order or clarity or a cultivated style. There are others whose style is highly cultivated, whose teaching is carefully polished and everything clear and neat and sometimes, unfortunately, it is so clear that it is empty and says nothing, for the personality behind it is without character and depth.

The human personality is a very complex reality. We need only point out that it embraces the whole man, is both material and spiritual without prejudice to its substantial unity. Thus it is that the spiritual and bodily factors do not merely exist side by side but interpenetrate and as one whole form a dynamic structure in which each constitutive principle works in view of the other. The human act which proceeds from this ordered whole reveals to us these structural principles and the meaning of their mutual relationships.

The result is that the corporeal behavior of man always implies a human meaning which carries into the spiritual plane also. Definition-wise the opposite is also true: the human spirit has an essential relationship to matter, and its activity, however immanent it may be, is by nature a function of the order of time and space.

St. Thomas does not hesitate to maintain that prime matter is the principle of individuation of the whole man, even for the human *spirit,* therefore, which is identical with the human soul and which is the one principle of human life and hence also the principle of organic life and corporeality. It would be difficult to conceive a closer bond between body and soul than that supposed by St. Thomas. The Angelic Doctor did not construct this extraordinarily bold theory a priori. He arrived at it by transposing the correlation which he observed between material and spiritual properties, especially the activity of knowing, from the level of empirical fact to the plane of substance. For St. Thomas as a conscious, personal being endowed with spiritual life, belongs to this world by force of all that makes up his constitution. This belonging to the world is so fundamental according to his teaching that it does not completely cease after death. In the life beyond, the human spirit separated from the body remains the "soul," that is, the principle of a body. It continues to be capable of union with a body, and it is through this relationship, which so essentially determines its place in the cosmic order, that it is an individual.

Since therefore human activity is so determined by factors of time and space, it is self-evident that Kant's *Critique of Pure Reason* could never have been written in the century of Pericles of Athens, any more than a Christian thinker in Europe in the thirteenth century could have constructed a philosophical system after the manner of Cankara-Carya or Ramanudja.

On the other hand human activity is co-determined by spiritual factors of intelligence and will, which make it free by nature. Within certain limits, that is, within its self-determination, it realizes itself and stands vigil over its own development.

Thus it follows that within this limit the intellectual richness and the penetrating power proper to the person are a function of the independent development of this person; in this sense they likewise depend on his freedom of choice.

Once it is evident than an autonomous factor is at work in the formation of the personality — together with oth-

er factors and in correlation with them — and that it is the personality of the thinker to which a philosophical system owes its depth and breadth, its special color and tone, it follows that the historical development of philosophic thought is not determined uniquely by factors of the purely logical order. Philosophy does not develop outside of and over the head of man, in an ideal sphere from which it descends upon him. To use an example: one can undoubtedly find a logical connection between the thought of Malebranche and that of Descartes. But Henri Gouhier correctly has pointed out that the system of ideas of Malebranche as it stands historically could have come to be only because it was thought out by Nicolaus Malebranche and no one else.

The essential role of freedom in the development of any human activity tells us that it is impossible to foresee what direction philosophic thought will take in the future. For this reason no one is in a position to foretell what form the social problems will take fifty years hence, or what values will be in the forefront by that time.

We can see immediately why a philosophical genius can never be supplanted by another and fade out completely: we can also understand that the majority of philosophic systems, inasfar as they correspond to differences of temperament and character, should never be discounted in a simply negative fashion. One need not extol the system of Plato, in order to agree that if the text of his dialogues should be lost the spiritual heritage of mankind would suffer seriously. Without entering the camp of Hegel, one must say the same thing of his works, and of those of every thinker whose name is of importance in the history of philosophy.

In all these points one is forcibly reminded of the comparison with the artistic genius or the great representatives of the intellectual sciences, such as the important historians. Every artist stamps upon his work the image of his extraordinary personality, and no one expects that two important historians of equal rank, even when they make use of the same sources, will write the same kind of synthesis. Nevertheless in this respect there are noteworthy differences between art and philosophy which we cannot develop here.

The considerations which we have proposed should not prevent us from turning our attention to other equally important points which must be seen with the others if we are to achieve a balanced view.

Philosophical geniuses unquestionably maintain the importance which assures them of real effectiveness through all ages. It is equally certain that they have something very personal to say to us which insists on being heard. But this by no means implies that they must all be of the same rank or that all that they have written is of equal value.

And this does not lead us to relativism. Indeed we see clearly that there is a certain relativity in our knowledge, but we transcend this relativity. It is evident that I always find myself in a certain situation, but I can know about it, for I talk about it. My thinking always displays a personal accent, but that does not prevent me from observing this and being conscious of it and comparing my theories with those of others, something which involves a comprehensive viewpoint by which I transcend my own person as well as the other person; for it allows me to direct my view to myself and the other at the same time and to carry out a comparative analysis. On the other hand, if I do not put myself on such a transcendental plane, and if the other party is not on

this plane either, then we can never meet, we can never agree on the content of any idea whatsoever or on the meaning of any concept, and must give up the dialogue from the start. But it is a fact that there is intersubjective activity and that philosophers have never ceased to discuss things among themselves. We can therefore regard as proved on the one hand that our knowing processes bear the stamp of subjectivity, and on the other that we transcend it to the extent that we are capable of describing it and determining its limits.

Since we have been permitted to turn our attention to the history of philosophy and take part as spectators in the great philosophical symposium, the round-table conference of which I have spoken, we shall not refrain from making a few value judgments concerning it. Not all participating thinkers are equally great. Many of them who have contributed interesting reflections have also deviated from the truth in many points. If then we are right in saying that all are not of the same rank, who will forbid us to give the advantage to some of them over the others in a particular case, supposing, of course, that this choice is made on a reasonable basis?

When we consider *philosophical schools,* and their significance, we may ask how we should reconcile adherence to a particular school with the essentially personal character of all genuine philosophic thought. Such problems must be seen and solved in the light of the principles just developed. We cannot go into them further here.

## ABSOLUTE AND RELATIVE IN KNOWLEDGE

Let us take up briefly once more two of the conclusions given above. All human knowledge, even philosophical, is in a certain sense relative, for it is the act of a finite person situated in space and time, a relativity that cannot be avoided, for no man in this world can cast off these limitations or withdraw himself from the spatial and temporal conditions of his existence. Secondly all human knowledge is in a certain way absolute; that is, it is based on the domain of the true, for it is accompanied by the consciousness of its relativity and can therefore surmount it and pass judgment on it. This absoluteness is also irreducible, for it is an essential element of the human person and spirit, which is the source of an activity, an intellectual and volitional activity, whose formal object is transcendental, a formal object which in some way embraces all things without exception, including the absolute.

But is it not a contradiction to assign to the same knowledge an absolute and a relative value at the same time? The contradiction can be only an apparent one, for both qualities, "absolute" and "relative" are given to us by the facts. It is therefore not a contradiction but a *problem*: How are these two properties of knowledge to be reconciled with each other?

This problem, which we cannot pursue further here, can be solved ultimately on a metaphysical level, for the formal object of intellectual knowledge is the same as that of metaphysics, namely being as being. The fundamental metaphysical problem is likewise that of the many, namely of relativity on the level of being. How can we explain the fact that there can be many beings, finite, related to each other; in brief, an order of being in which being is still absolute and excludes every contrary? The same problem arises with reference

to truth, which is a transcendental property of being. Only when these problems are solved can we understand how different beings can achieve the same absolute, solid, single truth and yet each attain it in its own way, within the limits imposed by its own nature. This has to do with the problem of the being-participation in the *perfectio perfectionum,* whose solution must be sought in the direction of a metaphysical structure which is constitutive of finite being, as well as in a relationship of the total dependence of all finite being on infinite being, the absolute and inexhaustible source of all finite reality and of every participation in truth.

In philosophy as in natural science we are concerned with true knowledge of reality. But the philosophic horizon stretches much farther than that of the scientist, embracing all things without exception. For this reason the objectivity achieved by the philosopher is of a fundamentally different nature than that reached by the scientist. In any search for the basis of all reality the person of the researcher itself becomes part of the object of research. Therefore here also, the stamp of the personality of the researcher will remain in evidence to the very depths of his philosophy.

Philosophy is without doubt a *personal* undertaking, but those who undertake it work *together with others,* keeping up a dialogue at the symposium table. For this reason philosophy will never come to an end; it can never congeal. "Philosophy is an unfinished task," writes Cardinal Mercier, "it remains as alive as the intellect which frames it." This urge of the mind, this irrepressible and constant need for investigation, surely involves a relativity factor. But it does not involve relativism, for it is anchored in a corrective factor, that of absoluteness, the factor of truth, which makes it solid and stable.

At this juncture the nobility of the philosophic vocation becomes apparent, and it is clear what qualities a true philosopher must possess. He must have the spirit of *tradition* as well as a mind open to *progress,* and must know how to keep them in balance. He must be gifted with the spirit of *independent research* without endangering thereby his cooperation with his fellow workers. He must have the sureness of *personal conviction* joined with large-minded *tolerance.* He must be able to call his own the sense of unfathomable mystery, the *tremendum mysterium* that glows in the heart of all things, as well as the spirit of fearless research borne on an optimism which spurs him on to strive for a future of clarity.

*Source*: *SCHOLASTIK.* XXXV Jahrgang, Heft 1 1960, pp. 1-27. "Die Einstimmigkeit der Naturwissenschaften une die Vielstimmigkeit der Philosophie." **Complete Translation.**

*Presentation*: Louis Gatto, Saint Joseph's College, Rensselaer, Indiana.

# PHILOSOPHY of NATURE at the end of the Middle Ages

*by ANNELIESE MAIER*

A PROBLEM that has been discussed for decades with perennial zeal without reaching a solution is that of the relationship between the late Scholastic philosophy of nature and the classical physics of the seventeenth century. The contested point is whether and to what extent the thinkers in the fourteenth century in their explanation of inorganic nature, and especially in mechanics, arrived at conclusions which are to be considered "correct" in the light of later exact science.

That the philosophers of nature of receding Middle Ages in many respects went beyond Aristotle and trod their own paths is beyond dispute. The doctrines of the Philosopher were in part revamped and extended, but also in part set aside and replaced by new. In itself this process begins with the very acceptance of Aristotle; that is, with the discovery of the *libri naturales* and the Arabian commentaries on them. Robert Grosseteste, Roger Bacon, Albertus Magnus, Thomas, Aegidius Romanus did not by any means accept uncritically what Aristotle, Avicenna, and Averroes had to say, but at first they limited themselves to occasional objections and corrections, at least in points of purely philosophy of nature and physics which did not affect their cosmic viewpoint.

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It is only in the fourteenth century that the criticism of Aristotle and his commentators begins on a broad scale, accompanied by the gradual rise of an independent philosophy of nature. Two centers took the leading role in this development, Paris and Oxford, with John Buridan and his school, in which Nicholas Oresme is the most prominent, on the continent, and Thomas Bradwardine with his Mertonians, of whom the most famous are William Heytesbury and Richard Suisset (Swineshead), the "Calculator," in England. A little later a school was formed in Bologna around Matthew von Gubbio, who is important in the history of learning largely because of his receptiveness to the new teaching from Paris and Oxford, which soon spread into Italy through Bologna. In the last third of the century the new philosophy of nature had two outstanding representatives in Germany also, who came from the Buridan school and first taught in Paris. They were Albert of Saxony, founder of the University of Vienna, and Marsilius of Inghen, the first rector of the University of Heidelberg.

The cosmology of these "moderns" amounted to an intellectual revolution, which spread very quickly and in its essential points was accepted almost unanimously without regard to the opposition of the schools. There is no doubt that it offered much that was new and in many ways steered further development into new paths. But the question that is always raised, and on which there is no agreement, is whether the new insights, postulates, and theories set up in the fourteenth century in place of Aristotelianism are "correct" in themselves; that is, if they agree with the findings of later physical research. Apparently the opinion is widespread that the answer to his question is also a judgment on the worth of late Scholastic philosophy of nature as such and of all the recent study thereof.

### RECENT INTERPRETATIONS

This strange and unhistorical attitude, which almost harks back to the historical interpretations of the Enlightenment, goes back to the beginning of the twentieth century and the studies which in a sense brought to light the natural science of the late Middle Ages. Pierre Duhem, who, as is well known, must be credited with having opened this new field of Medieval study, saw the "physics" of the 14th century predominantly with the eyes of a natural scientist, and sought the early harbingers of later knowledge, with little ado about the intellectual environment to which this "physics" belonged and which is its key. Since then many things have changed. We have finally come around to treating this segment of intellectual and scientific history as we do others, that is, as a history of ideas, *storia del pensiero,* in the inimitable Italian phrase, without comparison with future achievements or evaluation as correct or false, considering it as the simple historical fact. But the old question has not died: To what extent did the findings of the *physici* of the 14th century anticipate those of classical physics?

We believe that a definitive answer to this question is impossible, for reasons which will always bear weight. First and foremost is the different standard of the various scholars who observe the "resemblances" and "anticipations." The rather rare instances in which the medieval thinkers made concrete physical observations beyond what was known to the ancients and expressed them with mathematical precision are not under discussion here. They are limited to the simplest facts and cannot be considered great discoveries. We are concerned with philosophical or theological texts

which express new ideas, whether casually or in detail, as random concessions, or as nuances which give us a glimpse of some new intuition. Naturally the field is open wide to interpretation, and often the interpreters are merely talking past each other. The subjective element will always be present. It is to be expected that the historian of the exact sciences will work with other criteria than the medievalist or the historian of philosophy.

E. J. Dijksterhuis has named these two viewpoints "ontological" and "phenomenological." He thereby concedes that "ontologically — that is, in the nature of the thing," the *impetus* of the Scholastics and the impulse of modern mechanics are basically different, whereas "phenomenologically, as they are used or could be used, there is not the slightest difference between the two notions," for both are measured by the product of the mass and velocity. We should like to add that this word "measure" in the case of impetus is to be taken with a grain of salt. We need hardly insist that for the philosopher this kind of connection between the concepts is hardly equivalent to identity. If we have never compared impetus and impulse, it is because we are convinced that the two concepts are ontologically incommensurable, and not, as Dijksterhuis thinks, because we misunderstand the notion of impulse. It seems that Dijksterhuis here and elsewhere expounds the Scholastic concepts in somewhat too modern a fashion, to the neglect of the ontological side, which for the medieval philosopher was always the more important and often the only side.

It is not only the criteria of comparison that are arbitrary and subjective, but also the evaluations and interpretations themselves. This is true to a certain extent even for the beginnings of classical physics and the factors that are active in it, concerning which we still do not seem to be completely in the clear. It is still more true for the Scholastic philosophy of nature, concerning which there are opinions without end, above all among those who are well versed in later theories but do not know the Scholastic sources at first hand or very well. Single passages and isolated ideas are pumped dry and ideas taken from them which are untenable when the background is considered.

A crass example is the misunderstanding of the concept *"forma fluens"* which has been mistakenly connected with the science of form latitudes and even considered the germ of the Newtonian fluxions, whereas the only connection between them is the name.

Equally weak is the recent opinion that Ockham's concept of motion anticipates the most modern physics. There are certain resemblances in formulation, but a world lies between them. Ockham's theory of motion stands at the end of a long development and not at the beginning of a new; it merely draws the ultimate conclusions from the traditional treatment. Hence one could with equal right read these ultra-modern views into Aristotle.

It is especially in the area of mechanics in the strict sense that again and again — always as a sequel to the early interpretations of Duhem — knowledge is ascribed to the Scholastics which was not theirs. For example, J. Abelé is of the opinion that John Buridan in his impetus theory had already discovered the principle of inertia in its physical content, but without giving it the metaphysical interpretation which it found in later times. This is an opinion that has no basis in the texts. We shall see later that the thinkers of the fourteenth century, on philosophical grounds however, came fairly close to the prin-

ciple of inertia, but did not take the final step. Obviously they did not know its physical meaning independently of the philosophical concept expressed in the impetus theory. For this "physical meaning" of inertia is, abstracting from philosophical interpretation: uniform rectilinear motion apart from resistance and external influence continues without limit. For the philosopher of the 14th century, however, this principle was valid only for the movements of heavenly bodies and not for terrestrial mechanics. On earth a movement of this kind would not attain infinite duration but would take place in an instant with infinite velocity. This rule was stated with all clarity by the Scholastic thinkers, and was one of the foundations of their entire mechanics, also for Buridan and his school.

Furthermore P. Abelé would have it, taking his cue from E. J. Dijksterhuis, that the Scholastic impetus is the precursor of Newton's *vis inertiae* as well as his *vis impressa,* and that Newton's distinction between the two is a forward step clarifying the impetus theory. Comparisons between impetus and Newton's *vis impressa,* that is, the cause of a change in motion measured by the product of mass and acceleration, were made already by Duhem and by a great many others since. What is new here is the attempt to connect even the *vis inertiae* with impetus and even identify them. In this these scholars have overlooked one thing: Newton's *vis inertiae* is no *vis motrix* but a *vis resistendi,* that is, a passive potency.

The third definition of the *Principia* reads thus: "The *vis insita,* or innate force of matter, is a power of resisting, by which every body, as much as in it lies, continues in its present state, whether it be of rest, or of moving uniformly forwards in a right line . . . and differs nothing from the inactivity of the mass, but in our manner of conceiving it. A body, from the inert nature of matter, is not without difficulty put out of its state of rest or motion. Upon this account, this *vis insita* may, by a most significant name, be called inertia (*vis inertiae*) or force of inactivity." [Motte translation]

In the last question of his *Optics,* where he sketches briefly the foundations of his system of natural philosophy, Newton declares: "The force of inertia is a passive principle by which bodies (he means the ultimate particles of which the universe is built) persevere in their motion or lack of it, receive motion always proportionate to the moving force, and resist only to the degree that they are resisted. From this principle alone no motion could ever arise in the universe. Some other principle is certainly needed to move bodies, and then, when they are in motion, another is likewise needed to preserve their motion."

But what has such a passive force, "from which alone no motion could ever arise in the universe" in common with the Scholastic impetus, which is supposed to be the active cause of a movement? Impetus points univocally to that other principle of which Newton speaks in this passage, which is necessary to move a body, and yet distinct from that which the movement of the already moving body contains. It points namely to the *vires motrices* which are the active causes of atomic movement.

On the other hand there is a precedent for Newton's *vis inertiae* in the philosophy of nature of the 14th century. Buridan nad his school speak of an inertia of masses, a passive force dwelling in material bodies which is a *potentia resistendi* and which brings it about that the state of the body can be disturbed only with difficulty. It differs

from the Newtonian idea merely in that it protects only the state of rest and not that of uniform movement.

This distinction expresses the contrast between Scholastic and classical mechanics as well as the one between the impetus, or more generally the Scholastic *vis motrix,* and Newton's impressed force. For the Scholastic the natural tendency of the material body is to maintain or restore the state of rest, and therefore every movement as such, that is, every constant velocity, requires a motive force as cause. Here we have, therefore, a nice distinction between active force and passive power of resistance and conservation, and there is no point in supposing relationship between Newton's inertia and Buridan's impetus which blurs this distinction.

### THE DISCOVERY OF METHOD

These examples should suffice to bring out the difficulties of discussing the findings of the philosophy of nature of the late Middle Ages as "correct" physical knowledge. In our view one should put the question, if at all, in another form. One should consider these findings and the historical development of the new insights of the 14th century not only along the narrow line to classical physics, but in its broader background. In the intellectual history of the Christian West the philosophy of nature of late Scholasticism begins a new phase in the attitude of man toward nature. It is a first attempt to enter into independent discussion with nature. It is a discussion which is carried on at first on purely philosophical grounds, leading to a certain metaphysical-epistemological rediscovery of nature but not yet to a mathematical-physical one. This development is simultaneous with the changes in poetry and art in which we are to see the first harbingers of the Renaissance. It is probably one of the components of this process, perhaps a more important one than hitherto supposed. Their findings considered from this viewpoint are less a change in the content of the traditional view of nature than a new way of understanding nature. In brief, what changes is the *method* of knowing nature. For the first time, the attempt is made to set up principles for an immediate individual-empirical knowledge and understanding of nature, independent of authority. In this the late Scholastic thinkers really accomplished something new and enduring. They blazed a trail which later centuries trod and which is still the path of research.

"It is absurd to seek simultaneously knowledge and the manner of knowing." This statement from the second book of the *Metaphysics,* which the Scholastics liked to cite and comment upon, could be hung as a motto over their own scientific endeavors. For while they often arrive at astonishing and modern-sounding insights concerning the manner of knowing, their positive science, with few exceptions, remains within the framework of their time, without showing the effect of the new methods. One gets the impression, in fact, that they considered it "absurd" to aspire to either, and that they consciously limited themselves to pointing out new ways to a knowledge of nature without deigning to use them themselves. These new ways, which were discovered under most varied circumstances, have one thing in common: they no longer take the detour over the authority of the Philosopher, but lead directly from the experience and the *ratio* of the singular to nature and its laws — an experience guided, these men are convinced, by the natural inclination to truth.

### THE EVOLUTION OF ARISTOTELIANISM

This attitude matured slowly in the course of the thirteenth century in the

discussions of Aristotle and Arabic commentators. Aristotelian empiricism, which at least in the realm of cosmology had almost entirely replaced the Platonism of the twelfth century, was transformed gradually into an individual empiricism, if we may so describe it. With the growing realization that Aristotle often — and for the fourteenth century very often — had also made mistakes, the conviction grew that the same authority which the Philosopher enjoyed must be allowed the philosopher also, and that the knowledge which philosophers attain in their own way has as much fundamental value as that of the Philosopher.

Naturally everything in Aristotelianism was retained that was not open to objection or subject to suspicion. Unfortunately in this inheritance, accepted tacitly or expressly, were a few principles which set an a priori limit to all the efforts of the late Scholastics which none succeeded in overstepping. It is strange that there was never even an attempt at criticism of these principles or a suspicion that they might be false, for everything else that Aristotle had to say was examined very minutely by the 14th century thinkers before it was allowed to stand. Two of these basic hypotheses may be singled out as the most important and the most fatal.

One is the theorem that qualities as such are independent factors with their own laws in natural processes. As "intensive magnitudes" they run side by side with the extensive and temporal ones, and like them are directly measurable quantities susceptible of mathematical treatment. The whole Aristotelian-Scholastic cosmology took its stamp from the role of these qualities or intensive magnitudes and even in the 14th century the situation remains essentially the same, with all the cumbersome difficulties arising from it, of which we shall encounter more anon.

The second principle is the famous: *"omne quod movetur ab aliquo movetur,"* every movement requires a particular mover bound to it and generating it directly, and every normal movement of a successive nature required, besides, a resistance which opposes the moving force and which is overcome by that force, for without resistance there would be not motion (*motio*) but change (*mutatio*), that is, an instantaneous change of place. This principle holds for every local motion, inertial movement as it was called later, as well as others that flow from local motion — we shall discuss them later — and which one and all stand in contradiction to classical physics.

Thus it is that some of the most important principles on which the innovators of the fourteenth century built their philosophy of nature were well calculated to detour their efforts into false paths, at least as to content. In fact this handicap is sometimes noticeable as well in their reflections on the formal principles and metaphysical foundation and their method. On the other hand their accomplishment is doubtless all the greater when in spite of all they arrive at the correct viewpoint. To what extent that was the case we shall now consider with a few examples. Naturally in these pages we must pass over details and pick out the most important points which will clarify what is special and new in the physics of the 14th century.

### THE CALCULATORS

We begin with a purely external and formal innovation, but important nevertheless, the introduction of letter reckoning and its use on problems which involve any kind of calculable quantita-

tive aspect. This new quasi-mathematical method penetrated into every area of knowledge, even the most abstract, and it soon became the dominant one. An entirely new science arose from it, the science of *"Calculationes,"* which turned its attention to the quantitative or pseudo-quantitative side of phenomena and events. A great deal of nonsense resulted from this orgy of calculation, for it was precisely here that the erroneous hypothesis previously mentioned made itself felt. The Scholastics were convinced that everything in the world that can be considered in the broadest sense an "intentional magnitude" whether physical or spiritual is just as measurable as extended spatial magnitudes and that calculations can be made with these measurements exactly as with others. An exaggerated quantitative ideal tantalized this philosophy of nature. The idea was not so much a goal to be reached but as something already realized by a higher intelligence — *omnia in mensura et numero et pondere disposuisti* — which philosophy could presuppose and which it could use at will in its speculations.

In spite of the excessive application of the principle there were two positive results. One was the use of calculation where it fits, chiefly cinematics. The calculations of the Oxford school led to some individual findings that were entirely correct. The second was the method as such. That the quantitative side of physical reality can be considered in itself and in the abstract is of course not a discovery of the fourteenth century. What is novel at that time is the broad systematic treatment, the development of a genuine method, a method that remained alive to the time of Galileo and Descartes.

An analogous case can be made for the method of graphic representation associated with the name of Nicholas Oresmes, a method which lived on for centuries in the science of form latitudes. In this method the intensities of qualities and velocities (interpreted as intensity of movement) were represented in a kind of diagram showing their dependence on space and time. For example the intensity of light on a surface may vary from point to point or vary with time at the same point. A correct system of coordinates was used. Again the possibility of graphic visualization of quantative proportions was not first discovered in the 14th century, but again this was the beginning of a real method and of its systematic use. But as in the case of the calculations the new method was used too broadly. Once more all intensive magnitudes, that is physical and spiritual qualities of any kind, were considered directly measurable, and it was taken for granted that the degree of heat or whiteness — or charity or virtue — could be represented in its exact quantity by a line as well as space or time. As in the case of letter reckoning, the method was also used to measure things that could rightly be considered measurable, especially in cinematics. If it did not result in new discoveries — they had nearly all been made previously by the Oxford calculators — it did show that existing quantative knowledge could be demonstrated graphically. This method also lived on into the era of Galileo and Descartes.

These two methods gave the philosophy of nature of the fourteenth century an aspect altogether different from that of the thirteenth. The problems discussed in the thirteenth century and the argumentation about them were all orientated toward Aristotle. But with the new methods everyone was given the opportunity to question nature for himself and answer the question in his own way. The immense activity devoted

to the calculations especially — they were more widely applicable than the more specialized graphic representation of Oresmes — was undoubtedly due to the feeling of freedom from the shackles of Aristotelian method and the exhilaration of the new independence. As a matter of fact, what Oresme had in mind was not analytical geometry. The boundless literature from the late fourteenth to the sixteenth centuries, filled with calculations of every description, and Oresme figures wherever possible, did not progress beyond what Heytesbury and Suisset had already discovered in the thirties of the fourteenth century. Apparently the later writers had no thought of learning about universal relationships through their reckonings. They were concerned only with setting up special problems, the more complex the better, and figuring them out according to the rules of the art. It is in the method itself that we see the great advance and in a sense the victory over Aristotelianism. What was of interest was the way of knowing, not the knowledge itself.

#### INFINITE AND INFINITESIMAL

A further point in which there was an essential change in the fourteenth century was the problem of infinity. Our philosophers did some fundamental ground breaking here along the lines of what was to be called infinitesimal calculus. This was also one of the new ways of knowing nature: the infinite and the infinitesimal were brought within the range of understanding. Of less importance here are the discussions, interesting and richly instructive in themselves, over the possibility of actual infinity, antecedent eternity, etc. These are metaphysical questions, and their discussion may have broken ground for certain philosophical speculations of later times. For if the possibility of an actually infinite spatial extension and an actually infinite past or future time are admitted, then it takes but one step to postulate their reality. But for the concrete knowledge of nature they do not carry much weight.

For this there are two other considerations much more important. The first is the inclusion of infinites and infinitesimals into the picture of nature as such, and the second is the resulting conviction that it is possible to calculate with them as with ordinary finite quantities. An important consequence is the replacement of the instant, the point of time without duration, by the time differential. The movement, for example, which takes place without resistance, no longer takes place in an instant, as for Aristotle and the Scholastics, but in a span of time infinitely short, or in other words, with infinite velocity. Likewise the point without extension becomes an infinitely small spatial magnitude in the many problems which stumbled on the obstacle — diagnosed correctly by the Scholastics — that an infinite number of points never yield a finite quantity. On the other hand the lively discussions in the fourteenth century concerning the possibility of a creation from eternity and on the structure of the continuum led some thinkers to the conviction that one infinite can be greater than another. If the world existed from eternity, more months than years must have passed since its creation, even though the number of both is infinite. Similarly one indivisible or differential can be smaller than another. It was recognized, therefore, that infinitely large and infinitely small quantities are subject to arithmetic laws exactly as finite ones. What was later known as the orders of infinities was not yet clear, though not far out of reach. The Scholastics were convinced that the series of whole numbers moves toward the

same infinity as the number of points in the continuum, or in modern terminology, that continua are enumerable quantities.

This was a great step beyond Aristotelian philosophy, which knew only an *infinitum in fieri,* and for which of course all infinities were equal. But again our thinkers stopped when they had discovered this new method without making use of it to acquire new knowledge. In other words, they did not discover differential and integral calculus. Although in some instances they saw that the quotient of two infinite magnitudes and the product of infinitely large and infinitely small are finite, and so on, they never got as far as calculating with them or establishing general rules. On the other hand the fourteenth century already achieved a series of important discoveries which are in line with later set theory. Let us mention only the principle of equivalence which Albert of Saxony expressed very clearly, or the principle of the so-called Dedikind cut. In any case they introduced the infinite and the infinitesimal into mathematics, and this was certainly the germ of later developments.

### THE MATHEMATICAL FUNCTION

It was Thomas Bradwardine who anticipated most strikingly the great science which was to come. This he did through a discovery published in his *Tractatus Proportionum* in 1328 and embraced everywhere with incredible alacrity, the discovery of the mathematical function as the means of describing physical dependence exactly. The particular formula with which he made this fundamental discovery is wholly false as to content, but this does not detract from the value of the discovery

He set out to express the basic laws of Aristotelian dynamics in a universal mathematical rule without trying to question the laws themselves. His findings are therefore materially false though formally correct. As did all his contemporaries, Bradwardine stopped short in his criticism of Aristotle when he came to the principle *"Omne quod movetur . . ."* and whatever followed from it. Every movement arises from the activity of a motive force against a resistance. When the two are equal, or when the resistance is stronger, no movement ensues. Only when the force is able to overcome the resistance does the body move, and that with a velocity which is measured by the excess of motive power over resistance. Thus far the hypothesis, which was not to be disturbed. The only flexibility was in the mathematical formulation. The excess of force over resistance could be interpreted either geometrically or arithmetically, that is, it could be expressed as a proportion or quotient, or as a difference. Furthermore the dependence of the velocity on this quotient or difference could also be variously expressed. Aristotle, or more particularly, Averroes, thought of the excess of the motive force over the resistance as a quotient, and the velocity — if the force is greater than the resistance — as proportional to this quotient. In the case of equilibrium, that is for $p = r$ when p is the moving force and r the resistance, the velocity (v) is zero.

This was the predominant interpretation in the middle Scholastic period, though occasionaly other possibilities were considered at least theoretically. But this Aristotelian-Averroistic rule involves a difficulty. If the velocity is made proportional to the quotient of force and resistance, $v = p/r$, then in the case of equilibrium, $p = r$, the value of v would be one and not zero as the physical hypothesis called for and as experience dictates. Until the twenties of the fourteenth century no one hit upon

this discrepancy. The proportionality of Aristotle-Averroes was accepted, and no one was disturbed by the fact that it required the transition from rest to motion to take place by jump, for when the force exceeded the resistance ever so little, the velocity would immediately take on a value greater than one. It was one of the fundamental principles of Scholastic cosmology that nature never moves by leaps but that every change takes place continuously, going through all intermediate stages. The Scholastics swallowed this contradiction without protest. Apparently they saw the state of rest ($p = r$) and movement ($p$ greater than $r$) as independent states to be considered separately.

At this point Bradwardine enters the picture and postulates that the relationship between velocity and the quotient of force and resistance must be the same for all values of the quotients, that is for all values of the independent variable. The Aristotelian supposition that this relationship is a simple proportion is therefore false and must be replaced by another. For the first time in the history of thought the demand is made that continuous natural processes be expressed by the appropriate mathematical function. The rule which Bradwardine finally figures out is extremely complicated. Expressed in a modern equation it is $nv = (p/r)^n$, where $n$ is a parameter, or in logarithmic form, $v = c\log(p/r)$. This formula actually fulfills the demand. The velocity varies continuously with the change of the quotient $p/r$, the value of $v$ remains positive as long as the force is greater than the resistance, and in particular if $p = r$ the result is not $v = 1$ but $v = 0$. The dependence of velocity on force and resistance is therefore expressed by a function which holds for all values. In content, as the expression of a natural law, the formula of Bradwardine is as false as the physical hypothesis upon which it is based. But the formal expression is a great and revolutionary accomplishment.

Bradwardine was fully conscious of this. *Ignorantiae nebulis demonstrationum flatibus effugatis, superest ut lumine scientiae splendeat veritas.* (The mists of ignorance having been dispelled by the winds of demonstration, it remains only for truth to shine in the light of science.) With these words he announces his new discovery after offering and rejecting several other solutions. And it is no exaggeration to say that he discovered here the methodical principle that later became the most important and universal tool of modern physics.

The importance of the discovery was matched by the impression it made, its rapid dissemination and the general agreement with which it was accepted. Obviously it solved a problem that had obsessed many another and fulfilled a need. Soon after its publication the formula of Bradwardine was used in all areas of knowledge, but chiefly in the *calculationes* in the strict sense, where it solved a great part of the problems. But even in philosophy and theology, especially in the commentaries on Aristotle and the *Sentences*, we meet the Bradwardine formula over and over and in the most varied company well into the sixteenth century. It gradually became the ready tool for describing any relation of dependence of one quantity on a proportion or the quotient of two other quantities, even when the problem no longer bore any resemblance to the original one of Bradwardine. Again it was the method as such that was influential and the method that lived on.

### MOTION

The adherence to the Aristotelian principle, *"omne quod movetur ab ali-*

*quo movetur"* not only switched Bradwardine's reform of dynamics onto the wrong track with regard to content, but it also paralyzed a new interpretation of motion which could have led to the discovery of the law of inertia, or let us say from which the law of inertia would have followed logically if the conclusion had not been warped in favor of the Aristotelian rule. This new interpretation of local motion, which is now detached for the first time from other "movements" in Aristotelian philosophy, namely from quantitative and qualitative changes, comes from Buridan. Rejecting the traditional view as well as that of Ockham, he saw in local motion an independent *fluxus* inhering in the body in motion as a kind of qualitative accident which on analysis appears much like a "state," as classical physics looks upon motion. But from this essential characteristic of local motion Buridan was not able to draw a conclusion which in itself is not very remote. If motion is an independent and "absolute" accident of the body in motion, analogous to the qualities, and like these has an intensity (velocity) and can undergo *intensio* and *remissio* (acceleration and retardation) and through divine power can even, just as the sense qualities, exist without a subject, that is, without a thing moved — all this Buridan supposed — then he could logically have supposed for local motion, as for the qualities, that once generated it is independent of its cause and sustains itself until disturbed by another force. He would have discovered the principle of inertia.

As a matter of fact a somewhat later philosopher of the fourteenth century, Blasius of Parma, who had also disentangled himself from many of the traditional obstacles, actually took this step, without pursuing the thought however. Nevertheless he expressed it clearly and unmistakably and can therefore be considered the discoverer of the law of inertia.

But for Buridan the way to this conclusion was blocked by that old Aristotelian principle, *"omne quod movetur . . ."* which he was not able to scale. It not only closed off the path to this discovery but also imposed upon him the task of relating this absolute accident of motion to a mover in such fashion that every momentary state would depend exclusively on the motive power causing it and in no wise from the state immediately preceding. The idea finds an approximate analogy in the workings of electric lighting, to choose a trivial example. At every moment the illumination depends immediately on the electric current. Its intensity follows that of the "force" that causes it, and it is extinguished at the very moment the force ceases to act, when the current is turned off. The light is not something self-sustaining, disturbed only by outside causes, but holds up only as long as the cause acts.

That Buridan conceived of motion in this way is clear from his own words, when he discusses the intensification and diminution of local motion, acceleration and retardation. The Scholastics had a number of theories to interpret the intensive alterations of qualities ontologically, the most important being the addition and the succession theories. The first supposes that an intensive increase follows through addition of new degrees to the old, the latter that the intensities succeed each other, that at every instant the present intensity is destroyed and at the next moment a greater (or less) intensity is generated anew. They supposed, therefore, a succession of forms so that the momentary state would not arise from the previous one but only follow and replace it.

Buridan's position here is significant. For the permanent qualities he holds the addition theory. When heat, for example, is intensified the degree of heat of the previous instant remains and new degrees of warmth are added which blend with it. But for local motion he casts his lot with the succession theory. The single momentary velocities follow each other but do not follow from each other. There is no direct continuity between the momentary states of local motion but only a dependence of each momentary velocity on its cause, the motive force. The continuity of the whole process rests solely on the continuous nature of this force, which naturally is also a permanent quality. In this fashion the interpretation of motion as an independent accident was harmonized with the principle,"*omne quod movetur . . .*" But a new way of thinking, pregnant for the future, was introduced into the tradition.

#### FORCE

In itself the principle that every movement supposes a moving force implies no obstacle to the birth of classical physics or to the principle of inertia. Many of the philosophers and physicists of the seventeenth century, all except the Cartesians in fact, interpreted motion as a consequence and not as the cause of forces. They referred all motion in the last analysis to the innate forces (*vires insitae*) or the *impetus* given to the ultimate particles at the creation of the world and from which first atomic motion and then all other types of local motion follow. But to conclude from this that the impetus theory of Buridan contains the first indications of the principle of inertia is to overlook an essential difference.

Let us explain this difference in Scholastic terminology. In the seventeenth century separate movements were referred back to *vires infatigabiles* universal, cosmic, indestructible, inexhaustible and incorruptible forces, while Buridan supposes a finite passing impetus which calls movement into being as a particular *ad hoc* cause communicated to the object to be moved. The point is that this impetus is a *vis fatigabilis;* it exhausts itself by moving the object. Buridan would have been able, as we have seen, to formulate a principle of conservation somewhat like the Cartesian one, if he had pursued his concept of local motion in logical fashion as a state of the thing moved which maintains itself as a permanent quality. But he did not take this step, and from his standpoint he could not take it. Because in his theory impetus was imparted by the human hand as a *vis infatigabilis* like the impetus which God imparted to the heavenly bodies at the creation of the world. In his theory it would not be the movement as such that carries on independently without outside influence; rather an inexhaustible and indestructible impetus would generate a uniform movement of unlimited duration. But this step also Buridan did not take, and could not take. He did take the step for celestial motion and actually postulated an exact analogue to the inertia principle of classical physics, but not for earthly movement. The impetus moving the heavens act as organs and instruments of the First Mover, and are therefore *vires infatigabiles.* They act from an infinite store of energy and impart to heavenly bodies a motion of infinite duration, whereas earthly impetus represents a finite amount of energy and works only until exhausted. This distinction between exhaustible and inexhaustible forces is the key to the distinction between Buridan's (earthly) impetus and the innate powers from which the seventeenth century deduced the movement of the ultimate particles.

The tract about the exhaustibility of forces has been little heeded till now, but it played a considerable part in Scholastic mechanics and involves some fundamental ideas. The concept of the motive force, that special active quality which is realized not in assimilating its object as other powers do, but in moving it, is one of the most obscure in the Scholastic philosophy of nature and really never received a systematic interpretation. For Aristotelianism the *"aliquid"* in the statement *"omne quod movetur ab aliquo movetur"* was first of all simply an animal force with all the elusiveness to mathematics that this implies. This was true also of the new physics of the fourteenth century. Sortes with its motive power can either move directly an object in contact with it or it can communicate an impetus, an offshoot of its own motive force, to a separated projectile. Let us put these two possibilities aside for the moment. In the normal case of motion through contact Sortes uses a force which "tires," *fatigatur,* and is gone after a certain time, but will be regenerated when Sortes has rested. The phenomenon of fatigue led the thinkers of the fourteenth century to distinguish two components in motive forces, and if this distinction is somewhat less than clear and occasionally runs into absurdities, still they recognized something correct and important. In short, they recognized the difference between energy and force. They saw that in the process of moving, something in the mover was materially used up, while another more formal moment caused and regulated this using up, or this transformation of energy into movement. This is the starting point of the distinction into exhaustible and inexhaustible forces, that is, into powers of movement which, so to speak, dispose of a finite or an infinite supply of energy, and therefore can move something for a limited or an unlimited time. To the exhaustible forces belong all animal powers of movement and all the impetus flowing from them. Inexhaustible are the movers of the heavens (and the impetus flowing from them, gravity and levity, but that does not concern us here).

This distinction of components of energy and force in the traditional motive faculty is a notable departure from Aristotelianism. It might have led to more precise notions and fresh discoveries, but again the thinkers of the fourteenth century did not follow up the lead. Here as in their work on movement and impetus they only pointed out the route to a new science without embarking on it themselves or at least without persevering in it.

### NECESSITY AND CONTINGENCY

In the areas from which we have taken our examples until now, the mathematical descriptions of natural processes and mechanical fundamentals, the "findings" of the philosophers of the fourteenth century are all somewhat relative, since the new approaches again and again came to a standstill before traditions still too strong to overcome. But there were also areas in which these limitations played no part, and in them we find an array of "correct" results. Thus we find new philosophical interpretations of causality, of necessity and contingency, finality and natural law, which led to striking and effectively modern perceptions.

The principle that every cause acts with necessity on a suitable *passum* in adequate contact with it, and that conversely every effect of a transitively acting cause — not necessarily the immediate cause but always present, even if at the head of a long causal chain — necessarily follows, was an ancient prin-

ciple usually quoted in Avicenna's precise form. But in the Scholastic Golden Age another necessity was thrust forword, bringing confusion to which only the philosophers of the fourteenth century were able to restore order. This necessity was the Aristotelian *"ut semper,"* forming a trio with contingence (*"ut frequenter"*) and chance (*"ut raro"*).

A cause acts with *this* kind of necessity when the action always takes place, as the daily rising of the sun. It acts contingently when it produces its effect in most cases but not always, and by chance if the event is observed in a minority of cases. A favorite example of the *"ut frequenter"* is the man born with five fingers, while six fingers represent an *"ut raro"* case. The five fingers are therefore not an effect that follows *"ut semper"* with real absolute necessity, although it is taken for granted that it is brought about by its cause with the necessity of Avicenna's principle.

For the modern reader these concepts are easy to characterize and classify ontologically. Obviously they deal not with the necessity or contingence with which the efficient cause acts but with the probability with which the effect may be expected. The *"ut semper"* corresponds to a probability of one hundred percent, the *"ut frequenter"* to one of more than fifty percent, and the *"ut raro"* one of less than fifty percent. This necessity in modern terms is simply statistical necessity, while the necessity postulated in the principle of causality for the activity of the cause as such, is a dynamic one.

### DECLINE OF THE FINAL CAUSE

Almost simultaneously with these reflections but independently of them these same thinkers felt the need of another important methodological abstraction much like it. It consists in omitting final causes from the physical world picture. Buridan and his followers had no wish to deny the action of final causes in world events, but they came to the view that physics can abstract from it and that on methodoligical grounds it is advantageous to do so. It was a basic principle of Aristotle emphasized ever and anon in Scholasticism that every final cause demands a corresponding efficient cause or presupposes it. A final cause never works directly, *a fronte,* but only in indirect fashion, through the medium of an efficient cause pushing from the rear. In this connection the philosophers of nature of the fourteenth century discovered nothing new and threw nothing overboard. But again they clarified a concept grown rather confused, and their clarification was important for further study of nature.

As well as we can tell it was Buridan who took the decisive step and recognized that for the explanation of natural events the principle of causality is enough, and that the final causes corresponding to the various efficient causes need not be considered; for — and this is the real point — given causes in the same circumstances act in the same way, and this way of acting follows certain immutable rules. From this it follows that every causal chain in nature is univocally determined from start to finish, and that reference to an end and explanation in terms of purpose are superfluous. Buridan dethrones the final cause and puts the natural law in its place in the physical explanation of things.

### THE INDUCTIVE METHOD

With this contribution is associated another no less important, the recognition of inducton as a scientific method. This also is a step beyond earlier Scholasticism. That Aristotle arrived at certain principles of his cosmology only

through induction was of course known to Albertus Magnus and Roger Bacon, but it was only in the fourteenth century that we find a separate claim to validity for this induction and for the inductive method worked out independently of Aristotle.

The situation was brought to a head by Nicolaus of Autrecourt, who considered knowable only what is assured by the principle of contradiction; that is, only what is absolutely evident in the sense that its contradictory involves an absurdity. It is hard to say whether Autrecourt really wished to be the representative of a positivism of pure experience in the style of Hume, as it seems from the dictum "I am certain of the objects of the five senses and of my own acts," or whether, as in other cases, he merely had the intention of raising his voice against all and sundry. In any case it is certain that Buridan considered his attitude an attack on the method with which he himself hoped to build his natural philosophy, and he reacted accordingly. For in his controversy with Autrecourt he was not concerned to prove that substance and causal connections can be known with full evidence. On this point he would undoubtedly have conceded that Autrecourt was right. But he turned against the methodological postulate of Autrecourt that the sole criterion of certitude was the principle of contradiction and the thesis that certitude of evidence does not admit of degrees. For Buridan scientific certitude certainly has degrees, and in his opinion it would be senseless to demand a mathematical exactness for example in the natural or moral sciences. In these sciences a sufficiently sure experience is adequate. Here the inductive method is enough, the "induction from many singulars by which the intellect, though it does not see the cogency nor the reason for it, is compelled by its natural inclination to truth to concede a universal proposition." He adds: "And whoever is not willing to concede such statements in natural and moral science is not fit to have much part in them."

It is experimental induction which is meant, as Buridan expressly emphasizes. What he understands thereby is induction which proceeds not only from the observation of daily life but also from regular experiments. This he clarifies in several examples, examples which bring out a new requirement, namely, not merely to lean on Aristotelian and other traditional "experiments" but to make personal observations and experiments which will lead by induction to a sufficiently certain and "evident" knowledge in the scientific sense.

This methodological principle is practically the program of modern natural science. Again it is just the discovery of a method which with one or two exceptions was never put to use. Once more the philosophers of the fourteenth century were content with knowing how to know; knowledge itself was not the object.

The result of, or possibly also the reason for, this attitude is a peculiar hiatus in the "new physics" of the fourteenth century: no one measured. Not only did our philosophers fail to seek ways and means of simple indirect measurements, but then even failed to make the indicated direct measurements. In their experiments and inductions they were content with approximate quantitative observations, and their calculations work either with arbitrary a priori quantities or remain in the abstract sphere of literal calculation. One may ask whether this attitude flows from not wanting to or not being able to; whether they left the measuring undone because they consciously renounced really exact science and were content

with purely philosophical reflection on methods, or conversely, whether they took this attitude through incapacity for quantitative observations.

We follow the first hypothesis. The Scholastic philosophers not only failed to carry out measurements or propose a theory of measurement, but they also explained from considerations of principle that really exact measuring is impossible. The reason is in the last analysis their view of the universe. They were convinced, as we have mentioned, that everything in the world, even the most abstract "intensive" magnitudes, had its fully determined, quantitatively expressible measure: *omnia in mensura et numero et pondere disposuisti.* But this principle, which justified every farfetched calculation, forbade measurement. For God the world is numbered and measured in all its details, but not for man. To him it is not given to know these measures exactly or to test them.

This was true not only of the intensive magnitudes, which of course are not measurable as the Scholastics conceived them, but also of the simplest form of measurement, the determination of length. As a matter of fact the Scholastics encountered a real difficulty here, for there was no unit of measure for taking and comparing extensive magnitudes. In practical life conventional measure had been worked out for everything with sufficient exactitude for their purpose but of course they were meaningless for this fundamental measuring. It fits nicely into the intellectual attitude of late Scholastic philosophy of nature that they declined in theory to recognize arbitrary approximations as the starting point of a method of knowledge, and that they did not care to know anything about a method that could build only on such foundations.

The final step, therefore, that would have led from the purely philosophical consideration of nature to exact natural science was not taken. But within the limits they set for themselves, reflection on the foundations and methods of knowing nature, the philosophers of the fourteenth century show impressive results, which seem to us much more important than the uncertain foreshadowing of a few particulars in physics.

*Source*: *SCHOLASTIK.* XXXV Jahrgang, Heft 2, 1960, pp. 161-187. "Ergebnisse der Spätscholastischen Naturphilosophie."
**Complete Translation.**
*Presentation*: William Kramer, c.pp.s., Saint Joseph's College, Rensselaer, Indiana.

# GREEK SCIENCE

*by G. S. KIRK*

FOR hundreds of years the Greeks did not clearly distinguish science from philosophy, and in this lay both their strength and their weakness as scientists. They simply set out to explain the world in all its aspects, no less. Most of the thinkers from the sixth century B.C. down to Socrates seem to have conceived that they could account for everything: how the world started, what it is made of, what is man's place in it. These early *physikoi*, physicists or students of the nature of things, possessed the vast aims and uninhibited imagination that have marked many of the great artists and thinkers of history. Yet, although they have given their name to an important branch of modern science — physics, the study of the nature and behaviour of matter — they were hardly scientists in our sense. They lacked the methodical attention to detail and the constant relation of theory to the observed facts that made possible the spectacular development of science from the Renaissance onwards.

#### PREFERENCE FOR THE LARGER PROBLEMS

All through the history of Greek science we can observe both the strength and the weakness: their intense interest in the world in all its larger aspects and their reluctance to focus on limited fields of vision; their magisterial attack on the greatest problems of being, and their pitifully inadequate supply-lines of detailed, accurate and relevant observations. It is often said that the early Greek thinkers did not bother about observation. That is an exaggeration. Of course they bothered, up to a point: what they were trying to explain was precisely the world of human observation and experience. They were even capable of exact procedures. Thales, for example, was known for his practical ingenuity, and devised a method for measuring the distance of ships at sea; Anaximander recorded equinoxes and constructed some kind of map of the heavens; empedocles used the wine-lifting pipette to prove the concrete existence of air. But their speculative flights went far beyond the control of their casual and unsympathetic observations. One reason is that these thinkers were not simply trying to explain the world as it is, but rather the world as man needs it to be — unified, comprehensible, and ultimately sympathetic. This tendency to interpret the world in terms of human needs, to impose a social pattern on Nature, can never be entirely eradicated from human thinking; but it was stronger for the Greeks than for the new scientists of the Renaissance or their modern successors. Admittedly there *are* certain kinds of regularity in our world, and it is with these that

science must be largely concerned. Yet the earlier pre-Socratic thinkers sought not so much to observe and classify these regularities as to invent some all-explaining and universal principle of existence. Even the Atomists, Leucippus and Democritus, whose theory of matter looks at first sight like our own, were glib and superficial when it came to explaining the detailed consequence of atomic shapes and movements. The followers of Pythagoras, to take another example, used his discovery of the mathematical structure of the musical scale as the basis of an elaborate semi-mystical theory of a universe somehow entirely made out of numbers.

In spite of these handicaps, the achievement of the pre-Socratic physicists is startling enough. Matter itself they came to regard either as continuous and capable of being infinitely divided, or as discontinuous and made up of individual atoms. Pythagoras and Heraclitus had turned their attention from the simple *identification* of matter to its structure and behaviour; Heraclitus at least seems to have supposed, reasonably enough, that the coherence of the natural world depended more on how matter behaved than on what it was made of. This was really quite a promising position: yet by the last quarter of the fifth century, physics, instead of advancing further, was going into a decline. The most serious blow was dealt by Parmenides of Elea, who about 460 B. C. claimed to have proved by logic that essential change in matter is impossible. "There is no such thing as not-being," Parmenides and the Eleatics argued in effect, "so coming-into-being, or becoming, is impossible. Change involves becoming, so the phenomena of change and motion studied by the physicists can have no real existence."

The deceptive simplicity of Parmenides' argument held his contemporaries and successors spellbound. Physicists like Empedocles and Anaxagoras did not challenge its logic, but they tried instead to meet it by devising systems in which *essential change* was avoided. These systems grew ever more complex, contradictory and improbable; and as a result, interest in the whole subject gradually declined. Socrates and his younger contemporaries turned to the study of human and social problems, which in an age threatened with decadence seemed to them of greater immediate urgency.


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In the next generation Plato did little to revitalize science. The Academy which he founded at Athens was strong in mathematics, and subjects like the classification of plants were discussed there — though as exercises in logic rather than for their own sake. At the same time Plato further developed the Eleatic approach to Nature, declaring that true reality must be a set of unchanging, immaterial and imperceptible "Forms," and that the physical world has no more than a kind of half-existence by virtue of its relationship with these Forms — a relationship which was unfortunately indefinable. Plato exhibits in a supreme degree the tendency to philosophical superiority, not to say snobbishness, and the aristocratic rejection of the apparently second-best, which had already shown itself in the pre-Socratic period. There is a famous passage in the *Phaedo* where Socrates discusses the reason for his sitting in prison and not trying to escape: it is not, he says, because his sinews and joints are so arranged that he is in the sitting position — the real reason for his remaining there is that he thinks it best not to run away. The mechanical conditions are subsidiary to the mental purpose.

### TECHNOLOGY UNIMPORTANT

This kind of motivation Plato applied to the universe as a whole. The truth is that when the Greeks needed a model for regularity in Nature they found it in the planned intellectual activity of man, particularly of the artist or craftsman deliberately shaping his material to a preconceived end. They did not find it, as men have since the Renaissance, in the soulless regularity of the machine; they did not have many machines and they did not like the idea of machines as such. The mechanical elements in causation, like Socrates' sinews, were held to be subsidiary and unimportant, and, for Plato at least, to be beneath the detailed attention of the true thinker. This is partly an effect of living in a slave-owning society; for if slaves do most of the work, it is a short step to believing that the exact processes of production are uninteresting; and even those who did not own slaves seem to have regarded technology as unnecessary and unimportant.

Thus by Plato's time the dislike of mechanics, the apparent inconsistency and over-complexity of fifth-century physical theories, and the tendency to explain the world's regularity as due to some higher mind-like cause, had all coalesced to divorce science from philosophy. Plato calls his dialogue *Timaeus* no more than a "reasonable story," but even so it is remarkable to see such an intelligent man arguing that the human head is more or less spherical because it is the most important part of the body and the sphere is the most perfect shape. Fortunately Aristotle, who was a member of Plato's Academy for twenty years and owed a great deal to his teacher, reacted strongly against the other-worldly tendencies of Platonism, against those remote Forms, and reinstated the particular objects of our world as the true basis of reality. But even Aristotle took off from here in a sort of inflationary spiral. He observed and noted the orderliness of the natural world, the relationship of individual to species and species to genus, the regularity with which a man begets a man and not an acorn or a fish, and the apparent purposiveness of most of the organs of animals and plants. But these observations convinced him that the motive and directional force of Nature is some kind of unconscious urge towards a complete and perfect reality. The only way in which this reality, the prime mover of the universe, could

cause mechanical motion without itself being moved, and therefore infringing its own perfection, is by being loved. So Aristotle decided in one part of his writings, in a very theoretical and Platonic mood — a pre-Socratic mood, almost. Yet at least Aristotle the philosopher worked partly on the basis of materials provided by Aristotle the scientist. This was a man who rejected the common Greek idea of what was intellectually respectable, and devoted a great part of his life to minute observation of the world of nature.

#### SCIENTIFIC METHOD IN MEDICINE

Apart from being a great observational scientist, Aristotle was a tireless teacher and organizer. He founded his own school, the Lyceum, in Athens, and proceeded to organize something entirely new, a joint effort for an encyclopedia of all branches of learning: not only physics, metaphysics, astronomy, mathematics, and biology, but also theology, medicine, history, literature, politics, and ethics. So one could perhaps say that the scientific spirit declined in the first half of the fourth century B.C., and established itself on a new basis in the second half. An exception would be medicine, in which some sort of scientific method had been fairly widely practiced from the fifth century onwards. The school of medicine founded by Hippocrates in the island of Cos spread its influence over all Greece.

Aristotle died in 32 B.C., a year after his former pupil Alexander the Great. This was a time when the Greek world, after the Macedonian conquest, was still in travail, and when the independent city-states were in decline. Literature, architecture and art all take a turn for the worse; philosophy is preoccupied with making the individual feel at home in an insecure world; but science breaks out and begins one of its greatest periods. This happened to some extent in Athens, but much more brilliantly in Alexandria. In this fine new Hellenic city at the mouth of the Nile, Alexander's Macedonian general Ptolemy I founded not only a great library but also a great research institute called the Museum, both of which were expanded by his son Ptolemy Philadelphus. The interest in Alexandria was primarily in literature and science, not in philosophy in the old sense. Alexander's eastern campaigns had made available much new knowledge about plants, animals, peoples and places. His massive sieges had produced a new technology of siegecraft and mechanics. The foremost settlers of Alexandria were Macedonian veterans, and for an ambitious and wealthy new city, set in a land of great technical achievements in building and irrigation, science was the thing both for prestige and for practical advantage.

This was the main setting for the resurgance of Greek science. Mathematics, the most theoretical of scientific studies, had already reached a high level in fourth-century Athens. In Alexandria Euclid produced his famous geometrical compendium in about 300 B. C., and shortly afterwards came the more original work of Apollonius of Perga, notably on conic sections, and the great geometrical achievements of Archimedes of Syracuse — for example his calculation of the value of $\pi$. Astronomy, too, had been less hindered than other branches of science by the lack of experimental method and by the prevailing eyebrow-lifting about anything smacking of manual work. The study of the heavens had been encouraged by religion and philosophy as well as by sheer curiosity and the practical requirements of sailors and calendarmakers; one can go a long way without cameras and telescopes, and Nature herself

obliged by setting up control conditions — eclipses and so on — at regular intervals.

#### CORRECT VIEW OF THE UNIVERSE

Aristotle's pupil Heraclides had argued from his remote colonial home on the Black Sea that the earth rotates on its axis and that some, at least, of the planets revolve round the sun. In Alexandria, Aristarchus developed this idea into a truly Copernican theory. Yet this correct view of the universe was soon abandoned, for two reasons: first because it ran up against the powerful picture of an earth-centered universe built up by Aristotle; and secondly because not all observed phenomena could be easily explained on the theory that the sun is at the center and the planets revolve around it. "Saving the phenomena" — or accounting for observed facts — was a professed Hellenistic ideal, and a scientific one, if strictly applied; but the truth is that the generalizing qualities of most Greek thinkers, and their unsystematic attitude to details and the immediate inferences that may be drawn from them, turned this ideal into one of saving *most* of the phenomena, or saving the most obvious ones and the devil take the rest.

So Plato's successor Eudoxus, and then Aristotle, had argued that the motions of the heavenly bodies could be explained on the assumption of a system of concentric spheres; the geometry of this was ingenious even though it did not really explain all the planetary movements. When Aristarchus' account of the universe revealed difficulties, the great Hipparchus reverted to the earlier Aristotelian system; he had the new idea of epicycles, or that each planet revolved on a little circle of its own, which itself revolved about the earth. Even as a purely geometrical solution this was still imperfect; but the world had to wait nearly 2,000 years for Copernicus to re-establish a solar system and Kepler to conceive that the paths of the heavenly bodies were elliptical, not circular. This is the true theory to save the phenomena; Hipparchus could not think of it, not because he did not know the geometry of ellipses, but because the circular revolution of the heavenly bodies seemed to be guaranteed by the idea that the stars are somehow divine and perfect and that the circle is the perfect figure.

It is not easy to draw up a balance sheet of the strengths and weaknesses of Alexandrian science. At some points they improved on Aristotle: by the time of Heron, who lived most probably in the first century B. C., experimentation and scientific method were firmly established.

Medicine was further developed by Hellenistic scientists. They practised dissection extensively, not on men but at least on monkeys, and acquired a good knowledge of bones, joints, and muscles: though their conclusions about the internal organs were still bedevilled by theoretical beliefs about vital heat and the four humours. There was an empirical and a dogmatic school, but the division applied to questions of medical treatment rather than to assumptions about the human constitution. Even so critical, learned and practical a man as Galen, in the second century A. D., accepted the old dogmas. He lived in an age of codification and was one of its chief exponents; so was the astronomer and geographer Ptolemy, who wrote a vast survey of current knowledge and reached some good new results, about mathematical geography and the distance of the sun and moon for example, by aligning information collected from different sources.

#### ECONOMIC AND CULTURAL DECLINE

Yet these men, though they progressed in system, had lost the old imagination, just as Heron, in spite of his experiments in mechanics and pneumatics and his ingenious toys and religious gadgets, seems to have lacked the power of creative induction. The third century A. D. saw a grave economic and cultural decline in Egypt and the Roman empire at large. Alexandria and many other outlying towns of the Greco-Roman world, from which so many of the great scientists of the first three centuries before Christ had come, sank into mediocrity, and the urge and opportunity for further scientific research disappeared. Thus the works of Galen and Ptolemy became crystallized as the last word, and dictated the trend of medicine and astronomy for over a thousand years to come.

It is unfortunate that the immediate legacy of Greek science was so sterile; that the brilliant men who lived in the centuries after Aristotle were preoccupied with new fields of knowledge and were not more critical of his physics; it is unfortunate that Galen and Ptolemy happened to come at the end of a cultural era and that such speculation as survived them became almost completely subordinated to Christian belief and doctrine. Yet the essential weakness of Greek science was an internal one, and this weakness was also much of its strength: its vision of physics as philosophy not mechanics, and its disregard of attainable minor discoveries in favor of unattainable major ones. For philosophy itself this attitude was not wholly unfruitful — for science, it was a terrible limitation. Yet even so the actual achievement was tremendous. If philosophy prevented it, at the time, from being more tremendous still, yet it was philosophy that elicited and cherished the greatest of all Aristotle's achievements, a workable formal logic. This was the tool that was to enable science to resume its advance from the Renaissance onwards, and to attain its true status neither as mechanics nor as pure philosophy but as "experimental philosophy," the name given to it in England by the founders of the Royal Society.

■ *Source*: *The Listener*, Vol. LXV, No. 1665, Thursday, February 23, 1961, pp. 345-46, and p. 359, column 3. **Complete Presentation.**

# WORK

# PLAY

# CONTEMPLATION

*by Régis Jolivet*

CRITERIO

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IF "TO PRODUCE" MEANS the transforming of any kind of material, work can be defined as any activity tending toward the "production" of a sense-object. The gardner, for instance, sets out to produce fruits or flowers; the bricklayer, to make a house; the locksmith, to make a key. The term "worker" designates in current usage those who produce or make things, sense-realities.

Play is quite different. It is an activity that has no other immediate end in view but itself, an activity that is carried on primarily for the sake of the enjoyment involved. Play produces nothing outside itself. More precisely, what is produced is accidental and has no specifying relation to the activity. The house of sand constructed by children can not be considered either habitable or serviceable, if the children be considered actual builders. The house itself is entirely gratuitous, having no value outside the activity that produced it. Once the game is over, it no longer means anything and exists only to be destroyed, a thing which the children soon do in order to begin anew.

Contemplation is the enjoyment, not of activity as such, but of an intelligible object involved somehow in activity. Thus the reader enjoys the situations and ideas developed in a book, say a detective story, the images suggested to him and the complications of the investigation connected with some mysterious crime. As with the child at play, who loses himself in the activity he enjoys, here too, the contemplator loses himself. He becomes engrossed in the intelligible object he contemplates.

### ACTIVITY - TENSION

In all these instances, we speak of an "activity," since it is evident in each that the subject is active. And in each this "force" is related to a kind of tension. In the case of work tension arises in the object to be produced, in the overcoming of the resistance of materials and in the achieving of the greatest possible efficacy through body movements or the use of instruments. The dominating element here is physical force. Tension is manifested in play in the setting up of ordered and harmonious activity which presupposes, at least implicitly, rules. A disordered game that tends to disruption is neither a game nor a properly human undertaking. The child, for instance, who incessantly pounds the keys of a piano with his small fists attests to the necessity of playing according to directions. In other words, his so-called play is nothing more than the vigorous production of unqualified noise, similar to that produced by beating a drum. Play demands reason, to be regulated and measured. It gratifies by its own power, insofar as it is the exercise of an activity capable of engrossing one by its very nature. But this enchantment is increased by the complication of rules, or as we might say, by the tension of movement exerted for its own sake. In effect, the activity of play is worthwhile just because of this complexity and one's own commitment to it. This enriches the activity itself, rationalizes and humanizes it in a way.

Finally, we have the tension found in contemplation. To contemplate is not to work; nor is it to remain idle. Idle contemplation is not contemplation at all but mere lack of activity. On the other hand, authentic contemplation is extraordinarily active, for it involves a deep attentiveness to the intelligible: to systems of ideas, to meanings, to imagery, to relations between elements involved in both ordering and planning. Analysis, comparison and synthesis, that recur incessantly, are often carried on

and completed by a further activity in silence, as we find in the highest degree of mystical contemplation, because it displays a pure activity which nothing, not even a word is allowed to disturb, unless it be the interior word itself. This richness can be so extensive that it defies all efforts to explain what confers on it its timeless character. It achieves, in fact, the maximum of activity in *the instant*. Thus contemplation takes on the form of vision or intuition rather than discourse, while both work and play are essentially discursive since they are activities in time.

### THE FINE ARTS

Some distinctions here may help dissipate some common misconceptions. We usually say that work tends to produce a sense-object as such (a cabinet, a watch, a house, flowers). But cannot art, even fine art which we associate with the activity of contemplation, also be regarded as having as its end the production of an object and one that is sensible; and even, as in the plastic arts and music, one that is so by its very nature? We say that it is true that art which is contemplation is actually ordered to the making of an object. But if it is related to work and falls under this activity (the painter producing a physical picture, the poet writing a poem, the musician composing a symphony, all of which are things), the work of art produced is not encountered insofar as it is sensible but as intelligible and it is from this aspect that it is included under contemplative activity and lends itself to contemplation. This is quite evident in the case of a poetic work, but it is equally so (though perhaps less evidently) in the plastic arts and in the arts of movement, as music and the dance. Though it is true that works of art, specifically paintings, music and dance and even architecture, enchant the senses of sight and hearing (*quod visum placet*) and involve the sensible without which they could not exist as works of art, the sensible has no other value than as an expression of form or idea. The end of art is to please, to engross and to enchant through the harmonious and beautiful manifestation of the form embodied. That work, on the other hand, can achieve a similar effect, uniting the beautiful with the useful in an admirable way, is surely its highest achievement, for it is then raised to the level of art. But nothing is changed through this in the order of essences, even though beauty, consciously and voluntarily sought or added as a special feature, may take over. The fact remains that the work is still a sense-object as such in the immediate order of finality (a cabinet or a house) and beauty is added to it in some manner by accident, whereas the work of art at the very outset and essentially is identified with beauty and the sensible nature is nothing more than a medium. It may be that in the plastic arts this mediacy of ends may continue to operate as the controlling activity from point to point endangering the essential activity of the artist as artist. Many so-called painters, in fact, are little more than artisans with imagination and many musicians but fabricators of music. Their double disgrace is to have failed at once against work and against art.

### INNERLINESS

Continuing on the level of essences, we may ask if it is not possible to establish an order of value between the different activities in which man takes part, to define the intrinsic worth of each activity and to establish which of the three in its own right and objectively speaking is the most noble, most dignified and most desirable activity.

Since the higher part of man that distinguishes him from the other orders of living things is spirit (while he forms part of the animal world through his body), contemplation which is a spiritual activity is the highest activity of man. In fact we can repeat here what Aristotle said of metaphysics, for he characterized it as the supreme form of contemplation: it is the most immanent activity of man, the one which perfects him most immediately and most completely insofar as it involves nothing exterior to man and is fully achieved within him. For the same reason, it is the most free activity insofar as it is the most detached of those dependent upon the sensible, that is, those things which come from the exterior and which limit our activity, making its exercise uncertain and precarious. It is also the most free in the sense that it is always transcending our reach, always open to the world of the intelligible.

Objectively speaking, play and work do not have the same intrinsic value nor the same dignity. In a certain sense work alienates man from himself, makes him a sort of slave of the thing with which he works and makes him dependent upon the world of things. Transitive activity by essence, work takes him out of himself and in extreme cases this process goes to great lengths, especially when only a part of his body is involved preponderantly and exclusively, as might happen in certain types of "forced labor."

Sometimes, it is true, work is dignified with the name *creation* as opposed to contemplation, which, it is argued, actually does not create anything. In the first place, the word "creation" is here used loosely, for work transforms things, does not create them. If it does insert a formal excellence in things, such as comes from the idea, this is not the product of work as such, but of contemplation; not the product of parts of a machine, but of the spirit. Even in the strictest sense of the term, contemplation rather than work would be considered creative. Furthermore, the productive activity of work is not pure; it is a commingling in varying degrees of the passivity that results from the very resistance of the material. The worker is faced with this difficulty by the very nature of work. Human progress consists essentially in lessening this passivity as far as possible without promise of entirely annihilating it, since it forms an integral part of work as an action in relation to things to be produced. Contemplation, on the contrary, is *per se* pure creative activity: what it engenders is intelligibility, a world of forms and ideas. And this activity is without any conjunctive passivity, except accidentally by the fact that the agent is *man,* and not merely spirit, exercising the activity of contemplation. God alone who is pure Thought creates in the strict sense of the word and consequently with no resistance whatsoever.

Play, which surpasses work in terms of dignity, is comparable to contemplation by the immanence of its effect. But it is inferior to the latter by the fact of the bodily activity involved and because of the subservience demanded of it which is analogous to work. Furthermore, the activity of play does not perfect man in the same degree as contemplation, because it does not encompass the intelligible, in which is found the true enrichment of spirit. Its end, involving exercise and vivacity more than thought and desire, is *biological* with all this term brings with it of the physical and temporal. Contemplation, on the other hand, by its very nature, is spiritual and nontemporal for by its object (the intelligible) it develops within the sphere of the eternal.

Finally, contemplation indicates its pre-eminence by another characteristic. It has the *value* of an end in contrast to work and play, both of which are means to an end and nothing more. Surely it is necessary to admit that man fulfills himself in and by the spirit and that all Nature, of which he forms a part by reason of his body, is at the service of the spirit. This being so, contemplation, which is the proper activity of spirit, will always be the final term towards which all the other activities of man tend. Work and play are controlled by contemplation, that is in the order of finality so that man can penetrate with each into what is best in himself, spirit. We can see how the myth so common today of a civilization where work in the sense defined is the supreme value implies a society where there is nothing but means. These means have value in themselves, which is just meaningless.

### THE EXISTING MAN

All this is true, we said, on the level of essences, where things are defined in terms of what they are and what they are worth *per se,* whether these be work or play or contemplation. But in our world, essences are never realized in their absolute state. They intermingle, for man is never purely and simply *homo faber, homo ludens,* or *homo sapiens.* And he could not be otherwise without surrendering his condition as an embodied spirit. We are finally interested in stating precisely the nature of work, play or contemplation in the real man, a *being-in-the-world* and a *with-being.*

Work, on the one hand, implies at once contemplation and play, for only when these are combined is work human. Otherwise, it would be nothing more than the activity of an animal. We must concede that "animal work" is as inappropriate as the term "machine work," neither of which is work in the strict sense of the word because it is merely an action rather than an activity, though in differing ways and degrees. Work, we can note, the production of a sense-object, necessarily refers to the idea of an object to be produced and as such includes the contemplation of an intelligible model. The watchmaker who makes a watch does so according to a plan or an order he sees within his mind. The watch is the realization in the sensible of an idea or a thought. In the same way, the mason who constructs a house does so according to a plan. It is true that work, on the other hand, can become mechanical, that the worker can be made into a simple machine, thinking the while of nothing. But in this case, which is a threshold instance, the work loses its human quality and becomes socially vilified, if not morally so. And we know that this is one of the most serious problems of our modern technical civilization.

It stands to reason, therefore, that work in its very essence (which is a complex essence as is man himself), is rooted in part in contemplation. Even in the case of mechanized work, in which the worker is reduced to the role of a simple machine, the machine is the worker who operates the machine and both the machine and worker have been contrived and thought out according to a model. He is an idea in act, a thought at work. Thus all authentic work is inscribed and it is inscribed in the intelligible.

Work also involves play, at least in its perfect and most truly human mode, for it is the nature of man to enjoy his own activity in which and by which he experiences himself living. *Homo faber* is also *homo ludens,* not merely designedly or by accident, but fundamentally.

And the most perfect type of work develops, at the same time, into an activity of play which is a source of profound delight. It is what all workers try to say when they indicate that they love their work and that whatever burdens it brings are amply compensated for by the pleasure it affords them. The complex delights of contemplation, creation, and play highlight the triple function of man in the midst of the world: to reflect on the intelligible, to fashion the world to his own image and to rejoice like a god in his own activity. It is possible to speak rhetorically of the "nobility of work" and to understand by these words something quite commonplace. Philosophy gives full value to this expression, namely, is that work is *par excellence* the complete undertaking of man who is not pure spirit but spirit-embodied-in-the-midst-of-the-world.

#### NOBLE CONTEMPLATION

This does not mean that by a paradoxical interplay of pros and contras that contemplation is devalued. This continues to be the most elevated activity of man, for all human grandeur consists in deepening the sense of the spirit. This is accomplished by both knowledge and virtue. Techniques themselves are the work of the spirit. Their purpose is to liberate man more and more from the subservience that saps his strength and to obtain for him the full disposition of his spiritual powers.

But it also follows that contemplation, an activity of man and not of a pure spirit, involves other human activities. "In speculative matters," we are told by St. Thomas (I-II, q 57, a 3 ad 3), "there is something in the order of work to be done; for example, the constructing of a syllogism or the building of a discourse; one must number and weigh." This applies with greater reason to the domain of the arts where contemplation presupposes work, the informing of materials by thought, exercised always in the very center of the sensible world. The painter who conceives or "sees" a landscape with its interplay of light and its internal order must have recourse to work to "realize it" on the canvas with pigments or pencils. He is not a worker in the strict sense of the word, for what he produces or "expresses" is not formally and primarily a sense-object or even a colored object as such, but an idea, or if you prefer, a form which is the landscape he "sees." And this sensible expression of an intelligible form necessarily requires work.

If on the contrary, the painter conceives his work only as work, he is no artist. The contemplative activity within him is only a means to an end, not an end which is the pure pleasure in a beautiful thing. We can say the same of the writer or musician. There is always some element of work imposed upon them in realizing what they have thought, conceived or imagined. But what is actually "produced" in each case is sensible only by accident. It is first and foremost the expression in the sensible of intelligible forms or ideas valuable in themselves. And no matter what the hardships and the time involved in producing this expression in sensible form, they do not detract from the contemplative value of the total effect.

Under another aspect, contemplation is also play. It is an exhibition of activity which brings to man the deepest satisfactions. First of all because it is exercised according to the spirit, according to the best in us, since it is purely immanent, beginning and ending in us. It is true as we said that works of the spirit go beyond the sensible. But it can be seen clearly that the sensible (the painting, statue, book, symphony) is nothing but the expression of the idea

or of the image and to appreciate it in any other way — as matter or thing — is the affair of the businessman or the speculator who changes ideas into things. Actually, because they are from the spirit itself, works of the spirit are *per se* outside the order of commerce. They really have no existence as such except in the spirit and for the spirit. Because of this they give such great pleasure to man and are among his greatest treasures.

Play, finally, also involves contemplation, for it is according to rules which give it (if in proper order) its grace, its harmony and its specific beauty. It is an order manifested, a thought inscribed in time. The man who plays becomes identified with play itself and its regularity. It is order itself in action, thought more lived than reflected. But the idea always governs it. Children who build sand castles play at being architects, and like them construct their edifices according to plans, with this difference that the work is less important to them than the act of producing. And it is in this element precisely that they develop their play, being neither primarily workers nor contemplators, although their play will involve at once both work and contemplation.

Doubtlessly, play has more in common with contemplation than with work. It has its own immanence since it is an activity that delights in its display and involves nothing more than this display. But this immanence is not perfect because it essentially involves the body and its mechanisms. It rises in part from nature, or more exactly, it is regarded as a means by nature, while the immanence of contemplation is pure immanence and is completed precisely where it begins, in the spirit, without the mediation of the body. Thus we can say that contemplation is perfect play.

It is like the very act of God whose immanence is absolute and whose activity is absolutely gratuitous even when He creates something.

■ *Source*: CRITERIO. 24 deciembre 1959, pp. 912-914. "Trabajo, Juego y Contemplacion." **Complete Translation.**

*Presentation*: Sister M. Delphine, c.pp.s., Saint Joseph's College, Rensselaer, Indiana.

# METAPHYSICAL DIMENSIONS OF WORK

BY

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COMMENTARIUM DE PHILOSOPHIA ET THEOLOGIA

WORK IN ITS RADICAL metaphysical implication is in some way co-extensive with existence. Nature by its essence works. And man, to exist must necessarily do something, however easy it may be — picking fruit, making a gesture, taking hold of an object. Complete inaction leads to rapid deterioration of being and its structure and ultimately to complete annihilation.

But work in its essence and absolute meaning and in the phenomenology of being is much more. Certainly in a comprehensive sense work is more than action and activity: other elements, principally of the psycho-moral-social order, enter into its definition. However, as far as its metaphysical-ontological value is concerned labor must, everything considered, be placed in the category of action.[1] From this angle one can say that work is inseparable from being: with the predicability of transcendence, from Absolute Being, eternal and infinite principle of action. And with categorical predicability, from finite being, spirit and matter, whose essence consists in action. In action it develops and perfects itself. The metaphysical, "every essence is through its operation,"[2] merges into the deeper formula, "every essence is in its operation." Matter consists and persists by essential dynamism in act, which, when it ceases does not destroy the specific ontological positiveness. And likewise the spirit can say that it completely

exists, or realizes its formal character only in the radical actuation of knowing and willing. It is not mere semantics to call the energy by which being is realized, act (first act), in the same way as operation is called second act.

The notion of act, so solid and complex in relation to human existence is clarified in its more remote and concrete explications, by this metaphysical meaning which reaches to its very roots and constantly enters into its effective reality.

### WORK: ACTUATION OF PERSON, OBJECTIVIZATION OF SPIRITUAL SUBJECTIVITY

The human being, essentially person, principle of knowledge, will and freedom, is consubstantially placed in space and time by the body. From this comes his "situation" and participation in the total order of being. In consequence, matter, time and space, and their synthesis, becoming, measure the human being from within, concur in determining every moment of its existence, condition and fashion the whole rhythm of its being. To be in time and in the order of becoming stresses further the necessity of work for a human being. Work is precisely action that unfolds in the temporal dimension and in this dimension is integrally merged our own action. Work, in the sense indicated, is essentially, though not exhaustively, defined as necessary projection of the human being, of his first level of existence, and of his development in time; of his progress, of his perfectioning, of his acting, in every area in which his universal essential potentiality lies open awaiting the suitable existentialities of his indivduality.

At his first entry into being the human person is a germ, an initial possibility extremely imperfect, at the very periphery of being. All his power to persevere in being, to pursue and carry to completion his existential venture, to realize himself through time and eternity, is entrusted to work. Indeed, above all else, although here we do not use the term in its proper sense, it is the result of work in the whole universe that we have laws and forces in act bringing to the person structure and physical consistency, movement and breath. And then, work in the proper sense of the word, in its new measure and transcendence, as a personal and free activity, brings man into the world. Obviously it is not the work of the person himself, but rather that of others, one's mother, one's family, society, in fact.

But very soon the germ so fragile and at the same time so solid (the only authentic and compact unity in which is centered, in the world, the vast expanse of being), the person, begins, however delicately and progressively, and always with the aid of innumerable external influences, its autonomous process of development, of integration and self perfection. And the possibility of success — the measure in which the person realizes its cosmic and transcendent, its individual and social meaningfulness, the extension and depth of value and of the values which it attains in existence — will depend upon work, above all upon its own work. And, if there is not at least a minimum of cooperation and personal effort, the sum total of cosmic and social forces will not be able to save it.

In this way work is equivalent to human essence and existence itself (person) in its historical and temporal operative actuation. Work in all its development and all its forms, primordial and advanced, elementary and complex, physical and intellectual, material and spiritual, work alone, technical and moral, individual and associational, is nothing else but the actuation of the potentiality of the human being. It is the

unfolding, indeed, of the nucleus containing the essential-existential-operative power. Work is human nature in motion and actuation.[3]

Under this aspect we see the essential human and personal interiority of work. In fact by ontological projection it proceeds from the substance itself of human nature. It is the expansion of its internal physical-intellectual-moral potentiality. And as such it is the externalization and objective projection of spiritual subjectivity. As development of the metaphysical nucleus of subjectivity, work is at the same time the revelation and actualization of the hard core of the interior potentiality of the person. It is at once pattern and proof in the empirical order, as well as the door to being, in the movement of a dialectic of a going out and return. Though it is surely true that work flows from a preexisting cause, operating a priori from the original ontological depths of the person, in its turn it flows dynamically back upon the person. It develops, elicits, forms, with incontestable power of determination along those dynamic lines through which action is unbrokenly centered in its basic principle of being. To say that work is in a certain sense part of the human person, is not to use a metaphor, if we view matters in their full light. Rather we express relationship of agreement and reciprocal causality on the level of the more profound structure in which the person fashions his constitutive relations with beings and existent things.

In consequence we can say that work is a transcendental deduction from human essence and person. It implies fundamental commitment of the person. It is contained in the dimorphism of his spirituality as absolute and universal, and of his empiricism as historic becoming in the order of time. The person as being and fullness of being has only this recourse: to place in act on the highest possible level its resources and ontological potentiality. On the ethical plane the very duty of work is no less than the essential moral freedom and responsibility of the spirit to actuate in one's self and in the social context of which one is an indivisible part, the perfection toward which its absolute and conscious interior call draw it.[4]

This meaning of the medium of construction and integration of one's own personal being is inherent in work in all its manifestations: manual labor, understood in a comprehensive sense turns the physical energies of the human organism to every scope of immediate individual service and transformation and modification of matter; spiritual-intellectual work, is the exercise of a superior faculty, intelligence, reason, will, directed to the creation of spiritual values, and intimately integrated by a relation of immanence with the person himself (knowledge, science, culture, morality, religion).

Let us suppose that every type of work on earth should come to a halt; that this multitudinous and prodigious process by which the spirit of man develops and actuates itself in the world would cease; this immense dialectic of purpose in things, in thought, in reason, in will. As a result the vista of death would open to the kingdom of the spirit. Man would soon follow the way to negation and universal eclipse and nature would hurtle toward its own dark and unseen ruin. Without work, humanity, if it could still continue in existence, would be dark and barbaric, sinking and disintegrating into the primitive obscurity of the mere physical and instinctive, a humanity no longer truly human.

Merely to be able to live, granting so much in the small measure which may be conceivable without any real work of one's own, to yield passively to the

instincts and primary necessities (but really, taken strictly such absolute passivity is neither thinkable nor possible), is not sufficient to constitute man, individually or socially. It is not sufficient for the more stable cultural-social level, and not even for the more elemental level of the physical-biological.

### WORK: EXPRESSION OF SPIRITUAL BEING IN THE COSMOS

In the process of self-development of the person in relation to work the cosmos enters with all its values and forces as concurrent, essential instrumental cause. This truth, whose correct evaluation is indispensible for an integral anthropology, rests on the metaphysical position which man occupies in the order of being. He is spirit in the flesh. Or shall we say, he is matter taken up consubstantially in personal self-awareness.

By his very constitution man is in constant communication with things and from this law of his being the most exalted personal values are not exempt. Viewed in its vast teleological complexity we may say, in fact, that the very shaping of the human person in its consubstantial physical-psychical context is the apex of the activity of the universe. Surely it is the purest and loftiest peak which the process of the world reaches in its creative expansion constantly flowing from the First Act. The rise of person in the universe thrusts upon the realm of being the necessity of a history which is not caught up as a mere link in the causal chain of cosmic reality. And therefore in a certain sense there is actuated the most pure and the only authentic creation.

The person pursues this path of freedom in empiricism of action, seeks (and finds) in the world of becoming a marvelous conformity and a universal concurrence of coefficiency. Work comes into being as a projection of spiritual being, functioning in and through the cosmos: not mere naturalistic expression of a biological structure thrust out by necessity and instinct (we assume these to exist), but the process of subjective realization which moves through an interior autonomy and integrates itself in the heteronomy of matter. Our work in its qualitative multiplicity, in every one of its indefinite professional forms (in the broad area of meaning which today legitimately makes use of these terms) is also the indispensible means of our moral becoming. The texture of our daily existence — be the days short or long — is woven into the warp and woof of our work. It is basically an operative synthesis.

The picture of man lacks much of its clarity if this totality of work in the constructive process of the person is not clearly present. Similarly, this projection of work to the depths of human nature explains how work and its forms, conditions, circumstances enter into the very foundation of the historic structure of the person to determine the complex individual and social pattern.

### THE POSITIVE DEPTH OF METAPHYSICAL-HUMAN REALITY IN WORK

The preceding considerations clarify many conclusions which today are being more specifically defined and universally accepted. Indeed in the larger view, work as actuation and development of the person gives rise to the antinomies. These show up particularly on the ethical plane in the history of the individual and of humanity. In all this we view work in the perspective of the free and finite, of the possibility of failure which the human person bears within itself.

Above all there are positive and substantial values contained in work. Clear-

ly work in its more comprehensive sense of actuation and expansion of being is an enrichment and a gift. Work is the continued newness of things, in the world, in the person, and therefore in a manner of speaking the constant life breath of being.

The personal subject (analogically, the same holds for any physical subject) through work contributes to the actuation of the total order of things. Engaging and involving the forces and laws of creation, it enlarges and enriches the order of things, shaping both itself and the world. The plant as it germinates and grows, takes in air and light, gives in return a new individuality. And this is true even though by the very nature of becoming the enrichment of value produced through the transformation of work involves the loss of the antecedent values and forms. So it is that the pulp of the fruit decays and the seed perishes because they effect a higher integration of being. The beauty of a forest is sacrificed to produce the fertility of a field. The value of a highway penetrating forests, meadows, cultivated lands with the rapid and dynamic pace of progressive civilization is acquired at the incalculable cost of existing forms of life destroyed in the process. Everywhere there is the process of affirmation, negation, victory, loss and gain, destruction and creation. However, in the total order of things, through the ascending teleological attraction of act there is an orientation of negative toward positive. Likewise when negative is concentrated and massed into forces of destruction, whether they be the necessary forces of nature or the free powers of men, we have the disruption of nature as in storms and earthquakes, or the evil of war.

The positive in work is concentrated in areas where it reaches full development as the creative expression of the free man creating new values in the world.[5] In a sense human work is not on the same level intrinsically as the cosmic physical work, nor that of other living and conscious beings. Still less is it to be compared with the work of the machine. It is in a specifically higher sphere of values. The autonomy and centrality which belongs to the person as formal-ontological participation in the absolute, is reflected in his work as his immediate expression. Only a conception which recognizes in the human person the integral value of spiritual transcenence can possibly conserve intact the value and meaning of work.

And an adequate and positive response to the query, what is the meaning of work, presupposes an adequately positive reply to the question, what is the meaning of person and life? Unless the meaning of man is solidly founded in the person, or in other words in freedom and consequent moral responsibility, his entire nature and likewise the world with which he is committed to the construction of his ontological synthesis lacks a firm gravitational center. It lacks that attraction of conclusive finality in which the dialect of ends, always open in the contingent and finite, reaches the pole of rest. Every form of monistic immanentism or of absolute naturalistic vitalism is a contraction of the bounds of that historic moment (even should the "moment" be measured by millennia) on the eternal horizon from which human work comes forth. On this horizon there opens, as it were from the background, human action and human work by way of its personal dimension.

Instead once we grant the absolute meaning of the person, every positive value which work attains in the empirical order, is orientated vertically and horizontally in the coordinate of con-

clusive value. And metaphysical value intrinsic to work as free pledge of one's own being becomes concrete and integral human value.

Today this concrete human reality of work is defined in the light of contemporary philosophical and historical awareness.

### CIVILIZATION: EXPRESSION AND FRUIT OF WORK

If it is certain that work is not the sole end of existence, it is just as certain that work is the indispensible instrument for the development of man and civilization.

Humanity has developed, reached its full stature, through work. Wherever the urge to work has remained primitive and static, the human person, individual and social, has stayed at a low level for thousands of years. It is a metaphysical necessity: absence of work is absence of the use of essential and personal forces. These are ineffective unless the inertia of non-being is overcome. Without work the person is a non-viable plasm, a half-reality. Indeed the person is not adequately defined if viewed solely from the ontological-static aspect. The human person as such is act in movement, impulse in becoming, reality reaching out transcendentally toward action. If act is absent or inadequate, the dynamic element which the definition includes implicitly is paralyzed, wounded. It becomes a source of degeneration and corruption, static, idle, corroded.

Civilization: the word suggests and reflects the brightness of the sun and in its full integral meaning includes the mission of the spirit. There is no doubt that it is the terrestial goal of man, because it takes up and expresses the becoming and expansion of the spiritual energy which God has entrusted to rational nature, to the person. Civilization is the gradual and progressive externalization in time and history of spiritual being. Civilization expresses, though indeed with hesitation and deviation, halt and retreat, the tension and movement of the spirit, reaching beyond finite values, toward the Infinite. It is the intensification of man and of all that is human; interior growth of the spirit in itself; development of action, reflection and power; triumph over need, over fear. Civilization is order, finality, organization; cultivation of the earth, discovery, production; village, street, city; poetry, thought, writing, education; economy, politics, religion; community, fraternity, love; flourishing of virtue, laws and duties; progress, art and technique. Step by step it becomes more efficient and prodigious; it is dominion over self, over things and the world; and finally, multiple and fertile source of freedom.

But all that we call civilization is work. Fatherland and family, well-being and freedom, science and culture; all indeed that is most exaltedly human springs from and is sustained by work. If human life is ennobled on earth beginning with a state of barbarous savagery, if an entirely new world of values has burst forth and flourished from the hard potentiality of the physical-spiritual world: all this is the fruit of work.[4]

### WORK: INSTRUMENT AND PRINCIPLE OF SOCIAL LIFE

In civilization personality unfolds in all its dimensions through work but above all in that fundamental order where the spiritual-moral potentialities are in play, the social life. The phenomenological social realization of the person is effected through work, which is both its instrument and its incarnation: from the first emergence of sociality in the unity of family (instinctive, free cooperation toward a common good on the part of beings bound by a bond of na-

tural love) to its increase in a group, in the tribe, the nation, the state. The forces multiplied, qualified and differentiated by work are progressively expanded and intensified in the unity of living organisms. Here all the parts, active cells, contribute to the construction of the social whole, and they in turn by reverse action of causality are supported, conserved, and integrated. In its advanced forms work is like a concentration of productive efficacy, with an ever increasing intensification and influence on the whole social fabric. The scope and the potentiality of current social achievement created by work in present day forms of social intercourse, national and supernational, is now the valid dynamic coefficient directed to the progressive spiritual unification of the entire human world.

We should note that in work and its more complete realization, social organization, we have an almost integral expression of all that is thoroughly human, the physical-cosmic, spiritual-intellectual, moral-religious. There work is developed, in its powerful social expansion, because man has become what he can and must be according to his nature; developed through millenia of pre-history and history because the synthesis of the universe grows toward its completion.

In that efficiency of social reality unfolded by work, the function of the machine is undoubtedly positive. But there are also well known and recognized negative aspects. The machine has produced new patterns of social living, influencing all of education, culture, science. The machine tends to accentuate the sense of unity and solidarity. The workers are taken up in a vast productive process. The law and the rigor of the machine makes them all companions one with the other. They acquire and develop the sense of active and indispensible sharers in the production of complex values, economical and spiritual, destined for the good of the entire social organism. In consequence, it forms in them a deep sense of responsibility, of duties and rights and a very clear realization of their own personal worth. The machine by its very immersion in matter, thus ascends to the very level of the spirit, since it is made the immediate instrument for the productive genesis, development, and fecundity of its specific values.[7]

Think of the vast network of cooperation and solidarity that makes possible a great enterprise, economical or spiritual; the construction of a turnpike, of a hydro-electric plant, of a modern complex productive industry, a textile plant, an industrialized farm, a commercial organization of distribution or exchange, on a national or international scale; or of an arena or stadium for sports, a tourist center, a center of scientific research, for education, for apostolic endeavor.

What a force we have here tempering and correcting egotistical individualism, coordinated in a vast and vital effort of universal collaboration in a social spirit. Today we are already moving, at a tempered pace indeed, in that direction. The great industries are departing from the narrow economic approach. They tend to become areas of social-cultural-moral formation, great families where the person of the worker encounters many factors, in the economic or spiritual order, contributing to his integral development (professional instruction, internal cooperation, library facilities, athletic and recreational organizations, various forms of social and professional assistance).

This, perhaps, is the most lofty present day function of work: to create and

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This, perhaps, is the most lofty present day function of work: to create and

mature the profound sense of social and community order, in which alone the full realization of the value of the human person can be reached.

### WORK: SHARING AND PROJECTING THE CREATIVE ACT

Human work is responsible for the emergence of a specifically new set of values in creation. Incarnation of freedom, work becomes the ontological center where matter is wedded to spirit and the cosmic universe embraces conscious purpose. Man is, in fact, due to his essential dimorphism, the mean between the physical and spiritual world. He does not wander as a strange shadow in that realm of becoming: we are not alien in the world but at home, for it is of our own substance. There is an exalted polarity in which the *homo sapiens* responds in an unbroken rhythm of ontological reality to the *homo faber*. And the living rapport between the two forms the entitative-dynamic axis of our being. It is precisely through work that man carries out his mission in the cosmic order of material-spiritual, and the material world is united with the spirit.

Work is the most authentic manifestation of the human being as meaningful synthesis in the universe. In work, as purposeful activity consciously brought into the world and developed in the world, we are able to collect the essential elements for an adequate definition of man, *homo, animal laborans,* man is a working animal.

Undoubtedly, man, infinitesmal fraction of creation, in alignment with the universe and its incommensurable majesty, can and must view his own work as an imperceptible vibration in an immense symphony. But in this his world, man, with his physical force (as such, in itself truly a very petty matter), with his hand, instrument of his thought, with will and love, his reason, intelligence and freedom, his sentiment and his passion, in this his world he has borne and bears creation to completion.[8]

He does not, strictly speaking, lose anything of self in the physical world but rather transforms the physical itself in the face of the spirit. He creates the world anew to his own image and likeness, rationalizing it, informing it with his own being. It has yielded to this shaping here in our kingdom of becoming. And man in this manner, by means of his work, makes himself revealer and integrator of the hidden divine designs of creation, and work itself, analogous participation in creative action.

The world penetrated, in its own unconscious being, with the creative idea, through human work, assumes a new face of rationality. This is not a violation of nature, but its exaltation and fulfillment, a response to an interior call of integration. The face of the earth is covered with human values, with joy and love, will and warmth, hope and passion, order and design. Beauty, creative and austere, modeled through millennia of profound action of our spirit and our history, is the result.

Through his body man is the living part of nature. But by means of work he becomes in a certain sense also its soul and spiritual form. The products of human labor are in some way spirit and person incarnate in things. Our machines, our homes, our cities, so stamped with rationality and purpose, so closely bound up with us in all the gropings of our being, our knowledge and love, are the actuality of the idea transfused in matter. They are new forms of things not indeed at the creative-substantial level but on the level of the immediate operative structures.

In work and with work man elevates things to his own personal substance, as though in this way he brought the universe to his own spiritual fountains.

The materialistic mind which does not know how to capture that pure and transcendental light of work and place its reflections on the psychological-moral-religious level has retained nothing of work except the dead husks.

### CAUSALITY OF WORK IN THE CONSTRUCTIVE PROCESS OF TRUTH

Artificer of civilization, participation in creation, work is the instrument by which man effects in time his essential commitment to truth, in the dual direction of objectivity and subjectivity. There is a sound insight expressed in the axiom, *verum ipsum factum*. In work man grasps and knows nature and himself. By means of work there is an application of force, intellectual and physical. One observes, inquires, scrutinizes, samples, experiments with things, nature and one's self. As a new demiurge he puts into act the truth dormant in things. He sees the laws and principles, the secret goal and designs in nature. He discovers the essential-dynamic mystery from which issues and in which expands the world's becoming. He brings to the surface the internal word which supports and spurs on the cosmos in its being.

The criticism of medieval science seems justified, it was in great part sterile. Though this was now and then due to error, it was also due to the absence (or at least limited presence) of action. What was lacking in it was that solid and fertile counterpoint to the validity of its rational preliminaries. Technique (and with it the machine) has contributed to the fuller revelation of meaning in creation, whether it be of things or of man himself. In fact though presupposing a certain degree of knowledge from which it flows, it at the same time concurs in the producing of science, promoting it in depth and extension. Man makes the instrument and the instrument after the manner of dialectic remakes man. Evident in work as we have already analyzed in relation to art (which for that matter is nothing if it is not a determination of work): the externalization and realization of the interior intuition fertilizes and matures that same intuition.

Ancient thought, bent principally upon elaboration of the concept and the value of contemplation, did not pay sufficient attention to the meaning of work in its metaphysical-social richness. In consequence the human and personally positive in work, particularly of manual labor, was devalued. The Aristotelian concept of man and of action (contemplation, activity at the summit, supreme goal of man) may be fundamentally correct from the mere ontological point of view. But taken in itself basically, it is only partial, incomplete and one-sided. Wherefore it cannot present man in the full authenticity of his being and becoming. Neither the one nor the other can attain completeness without the synthesis of two elements: to do and to contemplate.[9] In his progressive realization man is indeed a self-expansion of the world of spirit. But at the same time as an historic being in the order of becoming, he is also a creative commitment by means of work emerges from the particular and the empirically contingent.

Being and becoming, universality and empiricity, contemplation and action do not unite in work by way of an extrinsic bond of co-existence, but they interweave in an unbroken fabric of mutual efficiency. Unto this end, the same technique assumes noetic instrumental function of indispensable value. Wherefore it is only by means of the technique that man learns to dominate matter and bend it to his spiritual world.

At the same time, with the revelation of things we perfect in work the

revelation of man. Action is the portal through which the spirit learns to know, and knowing self, re-enters into self. Through labor man discovers what he is and what he is worth. Only by explanation of one's own activity does man have a clear knowledge of himself.[10] The multiplicity and vastness of work manifests in time the inexhaustible potentiality of action and hence the ontological truth contained in thought and in will. In consequence, work is not only the instrument of actuation of the person, but also, and strictly thereby, the revelation of the internal, essential dimension of man.

### WORK AS SPIRITUAL ASCESIS

The insights implied by the preceding remarks are of immense importance in the field of education.

As realization of the person, work derives from the structure of the person not only its meaning but also its laws. But harmony of meaning and laws with all the demands of authenticity and truth of person is not assured a priori. It must rather be sought after and guaranteed by the commitment in freedom. In fact, since work by its nature tends toward being and imposes being, it must be a moral value and acquisition, more precisely it must be free.

Work, any kind of work, insofar as it enters into the positive structural goal of the person, is in itself a school of life, authentic mark of existence, sincerity and truth, artificer and test of moral values, affirmation of virtue. In measure more or less ample, it confers on the person a sense of dignity, initiative and energy of will, fullness of responsibility. It nourishes a serene awareness and joy of existence. With work there is born and develops a legitimate and sound experience of earnest commitment, which every man bears in his conscience, to devote his time (which is his very historic existence) to a goal of universal value.

By fully revealing our worth and our power, work fills us with a profound sense of reverence as we face the awesome strength and majesty of creation, of its laws, necessity, transcendence. And at the same time a sense of reverent humility accepts the mystery itself, all the more profound, of our own being, essentially operative (thought, will, freedom) which we can preserve and integrate in the pattern of love to which we are commited here on earth.

It is also in action that one nurtures a sentiment of respect and obedience in relation to these same intrinsic laws of work, whether physical or intellectual-moral, laws which we cannot create or change at our pleasure, because they are basically expressions of the infinite order of creation. Accordingly, in our own consciousness and in science, the laws of thought and of truth, and in every type of operation and work, we form an essential rapport of harmony and homage toward the Absolute. In the *perfectio operis* which every work, even the most insignificant,[11] demands as necessary response to its intrinsic finality, there is expressed our reverence for objectivity, our renunciation of arbitrary subjectivity to reach out to intrinsic and universal value. This perfection, precisely because it is such, is also *perfectio operantis,* an element of integration in the person.[12]

### PERFECTION OF MEN'S TERRESTIAL VOCATION FOUND IN WORK RELIGIOUS NATURE OF WORK

We need not dwell on the meaning which our personal daily work possesses in the religious realm. It is realization of our earthly vocation, natural and supernatural: the things necessary to sustain our sanctity, the means necessary for

our individual cooperation in building up the kingdom of God on earth.[13]

The complete devotion to our work, day by day, is proof that our existence is in harmony with the norm of morals and with the realization in the world of the transcendent meaning of life. Our moral forces are practically always taken up by the energy which work demands, by the composite of virtue, dedication, constancy, generosity, spirit of fraternity, renunciation and sacrifice which suppose all these and at the same time promote them.

Work effects, universally, the necessary mediation between instinct and reason, nature and freedom. It encloses and at the same time coordinates the disordered potentiality of human nature which it confronts with a rationally constructed efficacy. A rational construction in effect: of matter and things, but above all, as was noted above, of the spiritual-moral subjectivity itself.

Work balances the operative-creative equilibrium of the internal metaphysical antinomy of the spirit and matter in our being. In this lies its fundamental and indispensible ethical value: without work man would remain substantially restricted to the existential level of the law of nature, instinct and passion. Correctly the Christian and supernatural sense of life sees in work a conscious and generous commitment of our physical, intellectual, and moral forces. It sees in their intrinsic opportunities for universal service and communion, the effective integral elevation of our existence, the terrestial and historic incarnation of its transcendent message. Our work well done is the realization of the human and Christian law of love.

Therefore to say that work tends to depress man, enclose him in a circle of theoretical-practical positivism, in which he is in danger of losing contact with his interior spiritual authenticity, with the vivifying mystery of self and of God, is simply to be wrong. On the contrary, only work, as long as it does not descend to the inhuman or baneful, from whatever aspect of the essential and inalienable moral value of the person we consider it, has the power to immerse man in the sovereign grandeur of things, into the depths of the I and of God. Work is interior conquest, victory, ascension, power for good. It is the expression of our most spontaneous and personal causality. Therefore it is the principle of the positive expansion of the I in the world, the physical and social world, the natural and supernatural. Work is our thought, our will, our sentiment which discloses itself in creative power and therefore in the rise of value and of good.

Work, of its nature, is profoundly religious. Far from withdrawing the spirit from God, it places it within the very heart of His mystery. Basically, work is the person (will, thought, sentiment) in formation, and hence our spiritual reality in its most lively moment and formal participation in the eternal Principle of our being. Necessary expression of intelligence, will and love, whose objective term is infinite, including in its immanent horizon, transcendence. The man may by toil and fatigue, sweat and love, have produced the marvel of a field of wheat glistening in the sun: he could not fail to sense, first in his long creative expectation and now in the enjoyment of the results in a moment of elevated and happy contemplation, an exaltation very close to prayer, if indeed this is not actually prayer.

### LIMITS AND ANTINOMIES OF WORK

The vindication on a metaphysical level of the interiority of work in the structure and realization of the person does not at all lead to a totalistic and ab-

solutistic concept of work, a kind of mystique of work, that exalts it to the very peak of finality.[14] Work converges at the summit, which is the person, issues from the summit as means, effect, expression. It is the person and his fundamental ontological-moral meaning which must be the internal standard of work, measuring it from within.

Undoubtedly the insight of Marx is partially correct: for in work the human person is constructed phenomenologically. The historic-contingent conditions of work universally affect the determinations of the person, individual and social. But above all the person at its most profound ontological-moral level is the first source of work and hence also in some way, the principle in fact and right of its determinations.

Here is the key to an understanding of the limits and the antinomies that accompany work in its concrete historic reality. All human values reflect in their history the anguish of contingency, in which the person is situated and works. And nevertheless work reflects in the individual, in society, in history, the negativity and contradictions that follow the human person, eternal value in time, freedom in necessity, moral transcendence in contingency of becoming, spiritual absolute in the relative of the cosmic and historic. Human freedom is forever being endangered by evil and defection. Inertia and egoism, instinct and utilitarianism, rivalry and superficiality, ambition and pride . . . all the biological-vital forces which the realization of moral perfection, synthesis of human perfection, conquest of the *must be* confronting the *to be*,[15] endanger also the world of work.

In its real effectuation work is not always — perhaps never — fully equal to the person. Work is venture, like everything that is value in man. Total risk because in a certain sense work is the entire man. So a total deviation and moral decline of work involves a complete collapse of spiritual being. But it is not work that is responsible for human egoism, for subjection of the spirit to the tyranny of riches, for individual and collective yielding to the temptation of pride and pleasure. And therefore, for the immediate social consequences of that failure of the person: insensibility, hardness, cruelty; exploitation of man by man; slavery of body and spirit, fierce use and abuse of authority and power.

Every attempt to promote integration and perfection of self and the world meets with passive and active resistance (work is precisely fatigue, anxiety, suffering). There is the weight of inertia, cosmic and spiritual, which must be overcome in nature and in ourselves. Practically every work where effort or commitment is somewhat more serious and methodical, going beyond the pleasant exercise of our faculties, or the level of the indifferent in relation to decisive productive purposes, brings with it pain and sorrow.

Also our body and our spirit offer a kind of massive resistance, that only force and the spontaneity of will and freedom, commitment, courage, and at times a sovereign moral heroism have the power to overcome. It is sophomoric to suppose that the creation of a fully human civilization is an easy thing. The way is and always will be marked by tears and sorrow. Our progress will be contested at every step by every species of negation which seeks to defeat the achievement and the arduous travail of existence, individual and social.

A disabling restriction of the human person, occasionally very marked may result should one permit one's self to be totally taken up with the details and pressures of one's profession. This human weakness is manifested in the so-

called "professional defects," more characteristic and evident in certain highly specialized areas but to a degree present in every profession.

Despite all this the spontaneity and automony of the person can and must break through. It must surmount the limits of the individual and social profession and attain a relative completeness with an awareness and moral appreciation of the universality of human values. Every profession is a limited participation in this universality, but precisely because it is such it does not exclude, but rather reaches back to the universal and relates to it. The complex of natural attitudes in the psychological-environmental-historic which determine the individuality of every single person is not and must not be understood as an insuperable barrier deterministically hedging in the person. Such is the infinite spiritual verticality of man that the human person can find in itself the impulse to an unending integration and escape.

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In his activity and work, man must and can find his perfection and salvation but they may also lead to perdition and ruin. This is true not only of a particular and relative value (health, family, high standard of culture), which if lost, can still be preserved on a higher plane in the realization of the common and universal good and in the ultimate end of the person, which every work per se seeks to attain. The person can lose himself in work in the absolute sense by the destruction of his essential spiritual value. It happens every time that man alienates himself entirely in work and in its objectivity. Instead of drawing the world and creation into his own personal values he lets himself be overpowered by things. He renounces his metaphysical role of principle and fundamental spiritual force and lets his person be dissolved in the attraction and potent causality of the finite.

It is then that work, manual or intellectual, — even the most exalted philosophical speculation can lead to man's ruin — has superseded the person, things, the spirit. With work the spiritual being tends to interiorize itself in creation. If this interiorization, instead of being active, elevation of the material to the level of the spirit, is turned in the opposite direction with descending movement, then the spirit is in flight from itself, there is a kind of materialization and emptying of the spirit. This tragic pattern of ruin is not confined exclusively to work or even to physical work. It may be associated with any of man's loftiest values, with contemplation, love, art. The whole world since it is the instrument of our true essential and integral being, must be our enrichment. But it can also prove to be our misery, should it disintegrate our interior structure by departing from its essential pattern: which is spirituality and moral freedom.

Responsibility for this condition does not always rest primarily on the shoulders of the individual. Sometimes the social productive organizations of work are responsible. Or the political-educational structure of the state may restrict man to forms and conditions of work that are depressing or inhuman, or in some way unable to assure an integral formation of the person. The utilitarian-individualistic organizations of labor in the 19th century, the current atheistic-materialistic organizations of the entire individual-social life have favored and in every way favor this dispersion of the person outside itself, this exteriorization of one's own authentic self which finds the highest expression in moral-religious values. It is the height of tragedy that the supreme des-

tiny of humanity is threatened with shipwreck in that which is its purest value, its religious relation with God. And in the very dimension, work, whose just balance can be found only through agreement and harmony with the transcendent truth of fraternity and love.

### MEANING OF REPOSE

What in human existence is the meaning and function of repose? From the metaphysical aspect of work, it is clear that repose is not understood in an absolute but in a relative sense. Neither on the ontological nor on the ethical level can it be placed or accepted as total renunciation of obligation or responsibility of life and action. Such a renunciation would not only be tantamount to accepting as value what has been defined as source of every vice, but what is already in itself synthesis and concentration of radical immorality. No one is free to squander one's existence in idleness, to abandon the physical-intellectual-moral power of the person to a fatal process of self-centeredness, and therefore to non-being.[16] Life is a deposit of infinite value which the individual is called not only to preserve but also to carry to perfection: this is, it seems, the clear meaning of the parable of the talents.[17] There is no point to stress the repugnant moral weakness that characterizes the waste of stupendous fruits of work in a manner of existence, fallen beneath the level of the immanent rational finality, to the pure dialectic of consumption and pleasure.[18]

Quite different is the authentic meaning of repose. This supposes, in the rhythmic process of finite existence, a moment of relative cessation, or slackening of activity and of effort, physical and intellectual. Only in this cessation of work can we enjoy a richer and more understanding fruition of those goods which work can produce, and which constitutes in their totality, the synthesis of the perfection of person in his earthly condition.

Therefore repose is not, nor may it be, antithesis to work. It is not negation of work, but its conclusive term, its entelechy or perfected act, where the dialectical rapport to work remains intrinsic and alive. In the partial and relative cessation of operative activity the human person may present, in the more spacious rhythm of repose, as wise and reasonable fruition of the goods, immanent or extrinsic, personal or real, subjective and objective, the conclusive integration of his activity.

■ *Source*: *Divus Thomas.* A. LXII — 1960 — Mens. Jul.-Sept., pp. 273-293. "Dimensione metafisica del lavoro." **Complete Translation.**

*Presentation*: Edwin G. Kaiser, c.pp.s., Saint Joseph's College, Rensselaer, Indiana.

## REFERENCES

1. If we attempt to give a definition of work that proceeds from the exclusively ontological level and extends also to the moral-social, it would seem we should offer the following: free, personal activity producing value. However, we must bear in mind that in the category "value," no human efficacy is excluded, if it possesses a positive meaning in any order; we include every productive activity in the physical, economic, educational, spiritual, moral, religious sphere. All are included in this adequate definition.
2. I, q. 105, a.5; I-II q. 3, a 2 c; OG I, 45.
3. Work clearly has a finality that transcends the mere acquisition of the means of sustenance. The integrative goods of the person are qualitatively without limit: in every order of values, from the most exalted spiritual good to the purely biological. Indeed it follows that in the human world there is an

enormous mass of work to which men are driven not by a sheer necessity of living. It is rather the impulse for a fullness and intensity of life, possible only where there is a vast abundance of spiritual goods available, education, instruction, culture, science, religion, morality. The quantity of work which, beyond the prime necessities of life, seeks to increase and enrich the aforesaid goods (which seem altogether the object of free choice, even though basically, they respond to the most authentic human interest) is the principle and the basis of all progress and civilization.

4. This is not the place to recall even briefly the essential elements of the problem of the right and obligation to work. Let us merely note that the metaphysical foundation indicated above of the obligatory nature of work is not fully explained in ancient or medieval thought. Likely the modern notion bases the obligation to work on an intrinsic meaningfulness whish arises from collaboration for the common good and the requirements of social justice to the degree in which the individual responds to this duty and shares the sum total of goods which come to him according the varied standard to social living.
5. As indispensible means for dominion over the world and willed by God for His glory, all work possesses an inalienable dignity and at the same time an intimate bond with the perfection of the person. (Pius XII, Radio Message for the Feast of the Nativity of Our Lord, Dec. 24, 1943, in *Discorsi* IV, p. 341).
6. The creative powers of work, now capable of analysis in all the manifestations of life and of history is perhaps most obvious in the sphere of esthetics. In his undying instinct for the beautiful, transcendental form which moves the spirit to contemplative joy of value and to its realization in itself and in the world, man has filled the world with beauty: he has stamped things in all their multiform expression with beauty, even down to the pettiest humdrum realities of his daily existence.
7. The denunciations of the machine seem very biased. Certain reserve is necessary regarding its limitations. It has its unfailingly negative and one-sided aspects, in general and more so in certain determined contingencies of place, time, situation. All this is certainly true. But taken in its total context, the machine has been and is still among the most marvelous expressions of the spirit and of work, the incomparable instrument of human perfection. Human life entered its historic stage when work completed its first fundamental characteristically qualitative leap, with the creation of the machine, the wheel, the plow, etc.
8. "Work . . . pursues, in so far as it produces, the work initiated by the Creator." (Pius XII, Nobility and beauty of the work of the artisan, XI, p. 29).
9. "Man lives to the extent that he is active." "Our life is valuable insofar as it is activity for ourselves and for others." We like to recall these words uttered from the soul and the heart of a modern apostle, the Servant of God, Giuseppe Allamano (1851-1926). Founder of a Religious Congregation (Missionaries of the Sorrowful Mother) which, pointedly, bears the mark of activity, work. L'Allamano, harking back to the most ancient and authentic Christian tradition (St. Paul, St. Benedict, and above all Jesus Himself, who was the Son of the carpenter), had the vision and courage to stress with vigor the full human and religious value of work, vindicating again in particular (even though it was simply in relation to his purposes on a primarily ascetical-practical plane) the dignity of manual labor. The depreciation and misunderstanding of labor (not entirely corrected even today) was then dominant even in the formation of our seminarians. The passages cited are found in *Lo Spirito del Servo di Dio Guiseppe Allamano*, pp. 154-6.
10. The beautiful words of Thomas Carlyle have not only a literary but also a philosophical value: Cf. *Sartor Resartus*, vol. I, book two, chapter 7 *Collected Works*, p. 159. A certain inarticulate Self-consciousness dwells dimly in us, which only our works can render articulate and decisively discernible. Our Works are the mirror wherein the spirit first sees its natural features.
11. It is obvious that even the smallest act of manual labor always places the intelligence in act in some measure and therefore also engages the person.
12. What St. Thomas affirms explicitly for a work of art (I II q. 57, a 5, ad 1; ibid. a. 3 c) holds good also for all the manifestations (products) of work: the goodness of the work, as such, is not to be measured by the good will, or the intention, or the moral perfection of the person who does the work, but by the objective perfection of the work itself.
13. Work "is not merely the effort of the human members . . . work is service of God, gift of God, vigor and fullness of human life, merit of eternal repose" (Pius XII Radio Message, Dec. 24, 1943).

14. Cf. Pius XII Radio Message, Dec. 24, 1955 . . . vs. a mystic of labor basically naturalistic. Cf. also Intern. conferences on human relations in industry, "productivity is not an end in itself." (*Discorsi,* XVII, p. 510).
15. The statement of Hegel is substantially correct: evil is nothing else but inadequacy of being in relation to necessity of being. Encyclopedia, 472.
16. It is superfluous to mention that the positive use of life allows for infinite modes and forms. An occupation which from the standpoint of a purely physical outlook on life can perhaps seem idleness is instead authentic labor when it is made an instrument of a positive rational finality. The long hours which a custodian of a museum spends sitting motionless near the entrance of a hall are not spent in idleness. Always when the dimension "time" of our existence is stamped with a concrete rational significance, in the hierarchy of the individual and social finality of the person, time is productive, becomes work: "Non . . . otiose vivit qui qualitercumque utiliter vivit" (II II, 187, 5 ad 2; cf ibid: "Sciendum tamen, quod sub opere manuali intelliguntur omnia humana officia, ex quibus homines licite victum lucrantur, sive manibus, sive pedibus, sive lingua fiant: vigiles enim, et cursores, et alii huiusmodi de suo labore viventes, intelliguntur de operibus manuum vivere: quia enim manus organum organorum, per opus manuum omnis operatio intelligitur, de qua aliquis victum licite potest lucrari").
17. Mt 25: 14-30.
18. Paschal makes a good point of the essential negativity of absolute repose: Nothing is so insupportable to man as to be in complete repose, without passion, without concern, without diversion, without application. He senses his nothing, his abandon, his insufficience, his dependence, his impotence, his life, etc.

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# 6th conference

## at POTCHEFSTROOM

## FEBRUARY 1961

# PHILOSOPHIC FREEDOM . . .

## presidential address

by
H. G. STOKER

### HUMAN FREEDOM AS MASTERY AND SERVICE

TO DISCOVER human freedom we must examine typical human actions (essentially distinct from activities of matter, plants and animals). These are the acts of thinking, of naming and speaking, of creating and appreciating art; then also economic, juridical and moral "actions"; also activities of the forming of (and connected with) marriage, the family, the nation, the state and society (the latter including industry, the university, associations, etc.); and also activities forming history, creating technique and realizing values. Characteristic of these and kindred actions is the mastery of man. They all express human mastery. The antithesis of this is slavery. Fundamental human freedom viewed horizontally is mastery.[1] As master, not as slave, man is free. Should he, however, become enslaved to sin, idols, lusts, prejudices, etc., should he be mastered, then he is no longer a free person, but a slave. It is characteristic of philosophic freedom that man controls himself (including his functions of knowledge) and that he masters the philosophically knowable, and that he therefore also controls his presuppositions, posing of problems, his acts of thinking, his applications of methods, etc. But in his vertical relation to God (the *Arche,* the All-sufficient, the Absolute) the typical actions of man (creational and "non-self-sufficient" as they are), cannot be anything else but service. In relation to God, human freedom (as in religion and church affairs) is service. If, however, we view human mastery, as such, in its vertical dimension, then human freedom appears to be a mastery founded upon service.[2] All this cannot be elaborated here in detail. We should, however, like to observe in connection with the above, that human freedom as mastery, as service and as mastery founded in service, belongs to the nucleus of human existence; that it expresses itself (in

different ways) in all the particular freedoms; that it is concrete and positive, open yet ontically limited, that it is unique. In its relational independence dependent, on the one hand upon the cosmic data with which it is connected (including that which is mastered) and, on the other, upon its Origin (in Whose service freedom stands). It presupposes a possibility of choice and is therefore accountable. It can only be realized in obedience to obligatory demands and is therefore responsible.

#### HUMAN FREEDOM AS RESPONSE

Man does not give himself his ontic possibilities, but discovers them as presented to him. Possibilities, for example, like those given with his nature, faculties, talents, and functions; those given with the cosmos (among others to master it and to create culture from nature); those given with the obligatory demands; and those given with the revelation of God (for the purpose of serving Him). These possibilities are not in themselves meaningless, but have as such the "meaning" ("intention," "claim") that they be realized. They embrace, in other words, the ontic "call" to fulfillment, and set, consequently, man's tasks. The ontic possibilities (the presenting of tasks) are related to their realization (their fulfillment, freedom) as a question to its answer. Human freedom as mastery, service, and mastery founded on service, *is* the realization of ontic possibilities, *is* the fulfillment of tasks, *is* response. Human freedom is the answering of the ontically given "call." Viewing this call of the cosmos in its vertical connection (and also noting the "call" given with the revelation of God), it is God (the *Arche,* the All-sufficient and Absolute) Who with this call sets man his "calling"; and in this light human freedom is the fulfillment of a divine calling.

This view offers an opportunity to enter more thoroughly into the transition from the human possibility of choice to human freedom, and especially into the initiative of freedom which presupposes the possibility of choice. It is not man (and his freedom) who primarily has the initiative, but his possibilities (the presented tasks, the ontic "call"). Just as the initiative is ontically not with the answer but with the question. With his freedom (response), man in a secondary sense takes over the initiative. His response or answer (the realizing of possibilities, freedom) accomplishes something which the question (the possibilities) itself does not do. A question is incomplete. Human response (the realization of the possibilities, freedom) completes. From this the relational independence of human freedom is apparent, as well as the "non-self-sufficiency" and dependence of human freedom (an answer, for example, being dependent upon its question and having no meaning without its question). All this is even more obvious from the following. To be free (i.e., to answer the question, to fulfill the tasks and to realize the ontic possibilities given him), man must "encounter" his possibilities and be "claimed," held, convinced and inspired by them; in other words, man must respond and surrender himself to them and let himself be moved and convinced and inspired by them. Without faith in them, this would not be possible. And only when he allows himself to be claimed, convinced and inspired by them, can he take the initiative, i.e., actualize the possibilities, respond and thus be free. (How that happens, how a philosopher, for example, gains insight into a problem, how love is roused, how an artist is inspired, in other words how man attains freedom, is one of the most wonderful mysteries of human existence). Further-

more, just as a response (an answer) forms with its question an asymmetrical, complementary, correlational unity, so human freedom and the given ontic possibilities belong together. This implies that human freedom, as response, should not only actualize the destiny of man, but also that of the cosmos — both in the service of God. Even knowledge (answer, freedom) is an actualizing of the ontic knowable and thereby a realization of the destiny of both man and cosmos. Human freedom belongs essentially to the cosmos, as, for example, electrons, cells and instincts do.

Human freedom as response fulfills all the conditions given above. It is mastery and service. It expresses itself as the fundamental freedom in all particular freedoms. It is a concrete and positive freedom; it is open yet limited. In its relational independence it is unique, but dependent. It presupposes a possibility of choice and is accountable, but it is also subject to obligatory demands and therefore responsible. It obtains its order from the order of possibilities which it serves.

The above implies that man with his freedom (also with his philosophic freedom) is originally not a questioner (as Heidegger, Jaspers and Sartre indicate), but the originally questioned, the originally called. Man is, in other words, originally the responder.[3] Viewed in historic perspective, human freedom as an actually given response (answer: choice, decision, deed) which concludes an actually given question (actualizes a relevant possibility), changes the historic situation, in consequence whereof more (new) questions arise ontically. From this it is apparent that the course of human freedom is not comparable with an uprooted soaring of man as an original questioner but with a walk, whereby each answer gives a relational resting point and each act of freedom (answer) is a step on firm ground (the presented ontic possibilities, the "call"). When we view human freedom vertically in its responding rootedness in the absolute freedom of God, its course is comparable to a walk with God. If we attend to the relation of God (the Call-er) to the course of human freedom, then it is obvious that God guides the history of man in the same way as a question (the given ontic obligatory possibilities) leads its answer (the actualization of the possibilities, fulfilling of tasks, freedom). If we understand by truth the conforming of an answer to its question, then it is truth that frees; and it is freedom that actualizes (confirms) truth. From the above it is apparent, seen vertically, that there can be no conflict between the (call-ing) freedom of God and human freedom (fulfillment of response, of calling). On the other hand it is obvious that the loss of human freedom is powerless against the freedom of God, because man through his addiction has lost his own (secondary) initiative (his relational independence).

The most critical problem of human freedom is the relation of the freedom of God to man's possibility of choice because man can answer differently from what his ontic possibilities demand. He may desire the possible impossibility of being like a god, to seek the *primary* initiative in himself, and to appropriate for himself (like a slave) the right to decide by himself alone, whether or how to realize his possibilities and whether he will obey the obligatory demands (to which he is subject) or not. By doing so he rips asunder question and answer, and no longer realizes his destiny and that of the cosmos. The cosmos becomes a menace to him, but he, in turn, also to the cosmos. He becomes ontically uprooted and is *either* mastered by that to which he is enslaved (because sur-

render is a condition of human existence, even in his addiction to himself or to something else) *or,* having been uprooted, is siezed by an ontic doubt and soars in uncertainty. The critical problem now is posed with the question: how does man make a wrong choice; in other words, how does he lose his freedom? — Because by doing so, he stands judged as guilty. He thereby falsifies history, because his wrong answers give rise to false and misleading questions; and evil and strife become a part of history. It may be possible to penetrate more fully into this problem (from theological, philosophical and special scientific angles), but the attempt to solve it ultimately will be confronted by the paradox of the Divine omnipotent guidance of the cosmos (incl. man and his freedom) *and* the possibility of human choice, i.e. the paradox of Divine predestination (which is no determinism) *and* human accountability and responsibility.

Because man has a possibility of choice and his answer can fail, his answer can fail, his answer itself becomes a problem. Does my answer conform to the question concerned? In other words, do I act freely? The answer to this question is human justification in which conscience plays a cardinal role. The demand for justification cannot be evaded and is not transferable; it accompanies every human act.[4]

■ *Source*: Presidential Address given at the Sixth Conference of The Society for the Advancement of Philosophy in South Africa. Held at Potchefstroom, February 6 - 10, 1961. **Selected Presentation.**

1. Human freedom is a creation of culture in so far as the mastery of nature is a creation of culture.
2. We omit here the particular relation of man to his fellow-man. In this relation, human freedom is (not a totalitarian service like that of God, but a relational) care of love. It occupies an intermediate position between freedom as mastery and freedom as service.
3. Man also asks, but secondarily. He asks whenever he cannot immediately answer what was originally asked of him. His questions are a quest for ways to answer what was originally asked of him. So, for example, is an ontically presented problem a question put to man; with his posing of the problem, man then takes over the problem presented (or discovered). The posing of the problem is secondary; the discovery is primary. Man also asks when, by virtue of his possibility of choice, he answers incorrectly and when (uprooted from the ontic knowable) he gets lost on wrong ways and blind alleys. He then asks to find his way back. That man cannot be the original questioner, is also apparent from the fact that every human question already presupposes answers (knowledge), without which the question would be meaningless and man would not know what to ask.
4. This places man in relation to the All-sufficient (that is, in the presence of God), to Whom, in the first place, he is responsible for his actions.

# THE ROLE OF MODELS IN PSYCHOLOGY

by D. C. S. OOSTHUIZEN

WHAT I HOPE to do is to ask a few questions about two models frequently used by behaviorists and descriptive phenomenologists in psychological theory. The problems raised are not *psychological* problems. They do not concern the existence or non-existence of objects, nor the advantages of one psychological theory over another. What is at issue is the *philosophical* problem of the "logic" of a model and of its "mode of explanation." I do not claim, of course, that my remarks apply to *all* psychological "theories," "laws" and "generalizations." It seems, however, that the problems I have raised are not peculiar to two psychological schools or even to psychology as a distinct discipline. They concern psychology *as a social science* and point to issues well beyond the scope of this paper.

### THE BEHAVIORIST-INTROSPECIONIST CONTROVERSY

Turning now to psychology, we may start by considering a description of models and their use given by behaviorists. Psychological models, it is said, are concerned with two groups of issues:

1. to provide a methodological basis for psychology *either* in the sense of a method peculiar to psychology as a social science (phenomenology);

*or* in the sense of a methodological unity of psychology with other sciences, especially physics (behaviorism); and

2. to guarantee the thematic identity of psychology by the establishment, recognition and systematic employment of research designs which are specifically psychological — i.e. to establish psychology as an exact study of an adequate level of complexity.

To avoid tedious repetitions, I shall call such methodological prescriptions M, those of phenomenological psychology PM and those of behaviorism BM.

There is an important reason for accentuating M in psychology. According to both phenomenologists and behaviorists, psychology is particularly prone to an entanglement with philosophical disputes, notably the body-mind metaphysics of Descartes.

M, now, is supposed not merely to indicate what is desirable in psychlogical theory-construction, but to suggest *the* way in which these metaphysical pitfalls could be avoided. Both schools of thought claim that superiority of their methods is shown in the history of psychology in which they discern two main tendencies. On the one hand there seems to be a continuous tension in psychology between a "subjective" approach, based on the Cartesian postulate of a self-enclosed, essentially private mind, and a more objective approach, based on the postulate of an organism which is part of its environment; while, on the other hand, "static," "molecular" models seem to be progressively discarded in both the subjective and objective approaches in favor of "dynamic" and "molar" types so that in "many cases there is a spiral recurrence of analogous principles" in the two schools, "and on more advanced levels of methodological perfection."

This may be illustrated by considering what phenomenologists and behaviorists propose and reject in psychological theory and how standards prescribed in M are supposed to eliminate philosophical flaws.

### TERMINOLOGY

We have been using the word "model" (in much the same way as in many psychological textbooks), as a blanket term, without trying to analyse its meaning or its use in psychological theory. Before going on to this analysis I should like to make one remark and to repeat another.

Psychologists have claimed that their models are themselves modelled on the prescriptions contained in some M, and in this sense PM or BM are often called "models" for psychological theories — a model for psychological models. M, e.g., is considered as an "ideal of methodological perfection" which has its application to the subject-matter of psychology only via the kind of model we have been considering. As this latter kind of model concerns the subject-matter of psychology, or its thematic identity, I shall call them S-models, PS for descriptive phenomenology and BS for behaviorism. Where no sharp distinction between M or S is called for in phenomenology or behaviorism I shall use P or B to indicate their respective M-S models.

I wish to repeat that questions asked about the relation of M to S, or about the logical properties of M and S are not psychological questions. They do not depend for their answers on empirical information, and consequently they cannot pretend to verify or falsify or even modify psychological law-like statements or observation statements. Psychologists need not, therefore, feel exasperated at a philosopher's meddling in their internal affairs. What is under dis-

cussion is not the validity of their work, but what *their* meta-psychologists claim for it.

### INITIAL DOUBTS

A first confusion in trying to get down to our problem lies in the use (and misuse) of the word "model." One is tempted here to evaluate the claim made for the role of models in psychology by considering the role of models in physics — and with some justification in that behaviorists claim for their work a methodological unity with physics and phenomenologists a radically new "social-scientific" method. But the fact that we do have these counter-claims should act as a warning. No useful purpose is served, I believe, by simply borrowing definitions of "observation-statements," "laws," "theories" and "models" — such as they are — from contemporary philosophies of science. (The plural should again act as a warning!). A direct comparison of physical and psychological methods, might prejudge the issue by accepting uncritically the claims of behaviorists; and it might mislead by assuming that the differences between the two disciplines result merely from an application of the same kinds of experimental method and formal technique to different fields; and finally, it may presume (falsely) that the word "model" has a clearcut application in physics. (A comparison of the ambiguities of "models" in physics with those in psychology seems rather pointless). I propose, therefore, to ask first of all, how we ordinarily speak of models and to work towards more technical uses, in order to determine, if possible, in what logical sense or senses B and P are "models."

### MODEL-OF-SOMETHING

"Model" as we ordinarily use the word, *may* mean a "model of something," i.e., a construction of wood or iron or pencil-marks which is designed to represent visually relations existing between the constituent parts of an object or a situation, usually because those relations are for some reason difficult to visualize. The success of this kind of model may be gauged by comparing its structure to the salient points of what is being represented. (We may also gauge the success of the model by the uses to which it may be put — but then we speak of "models *for* . . . " and not "models *of* . . ."). No model of something, of course, is a perfect representation: this would contradict the principle of the identity of indiscernables. (But near-perfect representations are particularly subject to the old fallacy of arguing from disanalogies which are uncritically taken as analogies). This kind of model I shall call a pragmatic model and under this class we may include "rough models," "scale models," diagrams, pictures, etc.

Now while it obviously makes no sense to anyone that M represents its prescriptions visually, S does seem at first sight to be something *like* a pragmatic model. Thus, e.g., diagrams of a B or P "functional unit of behavior" are often found in textbooks; unlike a sketch, however, they do not represent visually any specific kind of behavior, but a *pattern* which claims to be the observed, basic, descriptive characteristic of behavior, i.e., *a concept or a definition*. To speak of such definitions or descriptions as pragmatic models is, I think, to assume that they refer to abstract ideas which in their turn are believed to represent the individual members of a class indifferently — or some other version of a picture theory of meaning. Thus, e.g., Boltzmann may be interpreted, perhaps, to have held some such theory when he wrote that "all our ideas and concepts are, after all, only

inner thought-pictures" and "theories being a connected system of such thought-pictures are therefore representations." This I am sure, is not the sense in which behaviorists would say that B is a model; and if phenomenologists who have often been accused of holding a picture theory of meaning, should claim that for P, their claim would amount to nothing more than legislating a peculiar use of the word "model": it would add nothing to our knowledge of the nature of P to say that it contains definitions (concepts) and that, that is to say that it is a "model of."

### MODEL FOR . . .

A model of something may be *used* for many purposes and could thus always be a "model *for*" something — although a model for something *need* not itself be a "model *of*. . . ." (If the Parthenon is a model for some school of architects, this does not imply that it is itself a model of some other building). This means that we may speak of a "model for something" in many senses. These various uses center around two main families of concepts. On the one hand we have models dealing with standards of perfection — such as religious, ethical and other paradigms. (Heroes, saints, prophets, buildings, etc.). On the other hand we often speak about models for understanding, explaining, interpreting, etc., something.

When it is claimed that M functions as a "methodological ideal of perfection" for S we have an example of the first main meaning of "model for." This claim, however, may be maintained in a weaker and a stronger sense: a scientist may choose M, either as an ideal in an *absolute* sense, or for reasons of expediency. He may regard M with a metaphysical conviction as the only possible choice for any S model, or merely as an ideal for a S designed for a limited purpose. But in both cases his choice is significant for our purposes only if he can advance adequate reasons for it, i.e., only if it can be shown that what there is to be explained logically demands S and that S logically requires M. *It has to be shown that the kind of problem which is legitimate in S requires the pattern of explanation or explanation or interpretation prescribed by M.* This, however, concerns the second main sense of "model *for*." Thus, having cleared the ground we now have to ask in what *kind* of way (rather than in what specific sense) B and P may be said to be "interpretative" or "explanatory" models in the "understanding" of behavior.

But this is to raise another mare's nest of logical problems. "Explanation," "interpretation" and "understanding" are systematically ambiguous words. Explanation, e.g., is explanation only in a specific context, which has its own *logical* requirements for certain kinds of question and answer; to ignore the contextual requiremnts for a certain *kind* of explanation leads to logically inappropriate answers and thus to confusion.

### DESCRIPTIVE PHENOMENOLOGY

In the well-known picture drawn by 17th Century philosophers, the mind is seen as a world to itself, furnished by "ideas" or other kinds of psychic entities. This limited the task of the psychologist to introspection: he had to identify psychic atoms and had to discover the "laws" according to which they were cemented together. Thus to learn the meaning of words such as "pain," "thinking" and indeed "learning a meaning of . . ." — i.e., to study psychological data — he had first to disengage himself from the public world of physical things in order to occupy himself privately with his own mental life;

secondly the experience named by a particular word had to be identified and analysed into its constituent "ideas" and "impressions." Once this had been done, it was supposed, these meanings would be distinct and clear, or, in other words, obvious. This kind of model is consequently said to be subjective, static and molecular: it sees the task of psychology as the analysis of a private, punctiform structure, "mind."

As there seems to be no place for any kind of prior engagement in this drawing, however, it seems meaningless to speak about a disengagement from a public world, and thus of any form of linguistic identification of atoms. Consequently, to accommodate a public referent which could anchor experience in the physical world, the drawing was redesigned. By common consent introspection was shifted from the higher forms of cognition to sensations, which were tacitly accepted as the, no-doubt inexistent, surface of the mental world. It was still thought, that is to say, that the meaning of words like "pain" had to be found privately by uncovering one's own bundles of punctiform entities; nevertheless these entities were faint copies of physiological entities (nervous responses) and were thus public by proxy. In this way the data of introspection appeared to be not wholly subjective: sensations corresponded in a logically adequate manner to at least some events in the physical world, and since the higher forms of cognition were said to originate from sensations, the mind was at least semi-public.

Despite these alterations, the model was still open to at least two serious objections. The spectre of solipsism was not yet laid in that private, subjective reports about *the* meaning of pain, e.g., were merely *supposed* to be linked to a public world. What "objectivity" the model seemed to acquire by being overhauled, was due entirely to a physiological theory of the nervous system which had to guarantee, in a manifestly suspicious way, what psychologists were doing. On the other hand, the approach prescribed by the model was embarrassingly sterile when applied to forms of behavior and activities which concern men in everyday life: the results of introspective sensationism seemed to be divorced from the everyday experience which it was supposed to explain.

Descriptive phenomenology is designed to meet these objections which, of course, concern the two groups of issues mentioned in M: a *psychological* method had to be found which could guarantee the results of introspection without impoverishing the field to which it could be applied. This method, PM, was found in the work of Husserl, and was thought to be a method as suitable to solve problems of behaviour as measurement could those of spatial movements. To apply this method the interspectionist model had to be overhauled once more. New conceptual factors were introduced and new arrangements of the older furniture suggested. One great improvement was that although the punctiform structures of earlier models were not entirely discarded, more attention was now paid to what these structures were supposed to do and how they did it: i.e., "function" replaced "substance" and "structure" as the main interest of introspection, and consequently introspection could clarify the meaning of a word like "pain," not by discovering mental elements, but by concentrating on the way it works in more natural forms of behavior.

The procedure prescribed by PM consisted in reflecting on the expressions we ordinarily use to describe psychological data (such as feelings or motives), in order to get down to the phenomena

themselves. These phenomena were regarded as complex and functional and not as molecular or static, i.e., as *acts* tending towards fulfillment or frustration and not as punctiform structures. Thus introspection seems to demand that *all* descriptions of behavior should be couched in terms of the formula *"Ego — cogito — cogitatum"* in which elements are used to attain specific ends, which are public in the sense of being objectively describable. Sensations, feelings, etc., e.g., were said to be meaningless in themselves; they could not contribute towards an understanding of conscious data — the *meaning* of pain or love — until they became significant by being used by a self for certain purposes. Because they are conditioned by personal and social habits and because they are logically relevant only in certain kinds of situations, purposes are obviously not private in the sense that they can not be described objectively. Purposiveness or intentionality, on the contrary, is conditioned by a universal and a priori structure of acts, or rather, by an a priori relation of functional dependence between acts. Thus, e.g., thinking presupposes perception, and both negation and affirmation refer intentionally to an implicit belief in that which is affirmed or denied. (To deny that "x is red" is to say that " 'x is red,' is untrue." PM therefore seems to require a molar, dynamic, purposive, introspective model, designed to discover, first, the functional meanings of pain, love, etc., and, secondly, to analyse relations of functional dependence in the flux of experience.

#### EVALUATION

If PS is to be regarded as a psychological model in *any* sense these confusions must be cleared up by showing that the *logical* relations between PM and a (possibly revised) PS are such that a *PS* conceptual scheme is logically, required for an understanding of behavior, and that such a PS could accommodate both the unrevised, or introspectionist PS and BS and their interrelationship.

I propose, therefore, to discuss a description of PM given by Husserl.

The main attack of behaviorists on PS was levelled against the idea of a disengagement from the world — and justifiably, because that is normally associated with Cartesian meta-physics. But this *epochè*, as described by Husserl, is *not* an event and certainly not merely a shift from sensory perception to introspection; (as, indeed, the *epochè* is often interpreted in PS and sometimes, apparently, even by Husserl). It consists, rather, in shifting one's attention from "what is," from empirical fact, to an analysis of meaning, i.e., in a logical change of universe of discourse. This is often obscured by Husserl's choice of language. Thus when he says that things unfold themselves within the scope of the transcendental reduction (the disengagement), and that these things are the phenomena of a transcendental experience which are to be described, he is talking about the *concept* "thing" which indeed unfolds itself in the sentence of ordinary discourse. (This confusion explains the obsession of some "phenomenologists" with *literary* descriptions of nausea, anxiety, etc.), or the adoption of the label by those who are so obsessed. The phenomenon to be described is accordingly the structure of the judgments (sentences and propositions) in which the concept appears; and, as is obvious from Husserl's work, this analysis is aimed at stating "laws of meaningfulness," i.e., logical rules which could serve as standards for distinguishing between "sense" and "non-sense" in the use of concepts. The PM "disengagement" thus concerns

a quest for what Husserl calls: a "pure" (philosophical) grammar of concepts and as this grammar could not be subject to empirical verification, he rather misleadingly calls the field of his investigations "the sphere of transcendental phenomena" or the "a priori rules" for the proper use of a concept. But as this "transcendental sphere" is clearly not a self-enclosed *psychological* or *mental* world the behaviourists' objections against "phenomenological meta-physics" cannot be directed at PM. (They are right, of course, in insisting that a self-enclosed mental world would seem to follow as a matter of course if an analysis of meaning is regarded as "privately seeing" mental acts).

In order to achieve the intended pure grammar of concepts, paradigm cases of everyday-usage (the life-world!) must be considered. Thus usages of concept "x" may be remembered, imagined, denied, constructed, etc., in any conceivable context, and a description may be given of that which is typical of "x" in these situations. (This is part of Husserl's *Wesenschau*). Because of this concentration on what is typical, paradigm cases of "x" need not be restricted to those actually experienced. Purely imaginative paradigm cases of "x" still embody the rules for the use of this concept. (If it did not, we would not be dealing with "x"). We may, and it is useful to do so, devise paradigm-games (*Gedanken-experimenten*) in order to discover these rules. Contexts which are merely possible ("pigs flying" or "stones floating") may be constructed, but in every game our initial choice of paradigm will determine the kind of world (language) given in the end. "Possible" and "impossible," i.e., "sense" or "nonsense" in these contexts refer to the standards for the use of "x" as they appear in our paradigms, and these linguistic standards are obviously not subject to empirical verification. (What *is* subject to empirical verification is the "truth" not the "validity" of a paradigm-game). Out of all these instances the "essence" of "x," its "noematic core" is distilled, i.e., the minimum meaning of "x" *that kind* of context, which cannot be altered without discarding the concept "x" altogether. This "essence" *prescribes* what *kind* of interest we may display in it. Thus, e.g., although "pigs" may possibly "fly" and "stones" "float" — i.e., although no self-contradiction is involved in coupling these concepts in synthetic propositions — it is impossible for them not "to be located in space" or not "to have some observable properties." And it is senseless to ask questions about the length of thoughts in terms of inches.

#### SIGNIFICANCE OF PM FOR PSYCHOLOGY AND FOR PROBLEM OF MODELS IN PSYCHOLOGY

It is in this sense that PM claims to provide a method for a pre-supposition-less philosophy, a description of phenomena as they appear to the theoretically naïve observer: if questions of *fact* are irrelevant, it makes no sense to speak about "theories" or "presuppositions" about facts.

It now has to be shown what significance PM could have for psychology, i.e., how PM could give us a description of a (revised) PS such as is logically required for by the various forms of interpretations, explanation, etc., of behaviour.

How this affects our problem about the role of models in psychology may be stated by considering Husserl's peculiar use of "ontology," especially "an ontology of the spirit" in which he suggests what relations should obtain between PM, PS (revised) and psychological research.

PM as we have seen is a *philosophical* method for conceptual analysis and thus

also for the analysis of psychological concepts such as "mind," "behavior," "motives," "reasons," "causes," etc. This means that PM describes the rules for anticipating what logical type of "phenomenon" could follow any initial "phenomenon," i.e., the rules governing the kind of description, expression, etc., which logically belongs to a concept and which we assume when we say "x and so on." A conceptual rule (x and so on) is not, however, a logically isolated atomic fact (*Sachverhalt*) — it belongs to a family of concepts within a language. (Husserl says that it belongs to a conceptual rule to have a structured fringe or horizon which properly explicated leads to a totality, the world). These clusters of concepts are usually arranged around one or more central concepts (categories or regional concepts), which do not refer to entities, but embody, so to speak, the syntactical rules for the use of concepts of that sort. "Regional ontologies" are these families of concepts which are arranged around categories like "thing" or "mind" or "God." This does not mean, of course, that these ontologies state what kinds of fact these *are,* but what kind of fact there *could* be according to the rules of ordinary discourse. In this sense an ontology is NORMATIVE for empirical research and forms part of empirical fact (*"und geht sugleich in die Tätsachenerkenntniss mit ein"*). PM in its analysis of the "fundamental, descriptive characteristics of behavior" produces what Husserl calls "an ontology of mind," and it is this conceptual analysis of "mind" that I have in mind when speaking about a (revised) PS — a statement of the linguistic proprieties which must be observed if one is not to end in "categorical" confusions, the *kind* of questions which may significantly be asked etc., as long as psychology claims to explain or interpret human behavior — a behavior which can only be described in terms of everyday use.

If we are to determine, then, in what sense an "introspective model" (PS) or a behaviorist model (BS) is logically required by the kind of "behavior" which it wants to explain, we shall have to turn to this (revised) PS in order to see with what families of concepts they are dealing, and what *kinds* of questions and answers are prescribed by the rules governing these concepts. This means that we cannot answer the question in what specific sense is a BS or a PS model a model in psychology, without some "ontology of mind" — a discussion, such as has been suggested or given by Husserl, Ryle, Peters, Hamlyn, Winch and others of "courses," "reasons," "motives," "perception," "explanation," etc., and of the ways in which these systematically ambiguous words apply in psychology. Nevertheless, the *kind* of way in which PS or BS may perhaps be called "psychological models," has I hope been suggested by some of the confusions in the expression "models": they are models for the explanation of behaviour *only* in the sense that propositions formulated within a specific conceptual framework logically require a certain *kind* of explanation; they are models in the sense in which *their* concepts and rules of explanation *fit* what there is to be explained.

#### A SUMMARY OF THE ARGUMENT:

1. There is no clearcut use of the word "model" in psychology. It is clear that some artifacts *may* function as a *model of* physiological movements, and may in principle be said to be a model *for* those movements in a hypothetico-deductive sense. They do not "explain" human activities, however, as normative descriptions cannot de-

ductively be inferred from non-psycho-logical antecedents.

2. Neither BS nor PS may be said to be models of anything. Their claims that they the models for the explanation of behavior etc., are suspect:
   a. because while they are supposed to provide the over-all framework for the explanation of behavior etc., they neither explain nor describe any specific "behavior achievement" or "mental act;"
   b. because BS is incompatible with BM *either* in the sense that BS logically cannot "explain" in a BM sense, *or* because BM logically cannot accommodate behavior as demanded by BS; and because PS is incompatible with PM, either in that it cannot logically make behavior understood in the sense of PM (it reifies concepts), or in the sense that PM is such that no valid S *could* be drawn up in accordance with it (PM is metaphysical.
3. PM properly understood is, however, not a set of rules for a metaphysical interpretation of experience, and therefore PS cannot claim to be compatible with the S demanded by PM. BS does contain psycho-logical antecendents and therefore BM cannot function as the rules for psychological "explanation."
4. A (revised) PS would, however, prescribe logical rules to both PS and BS, and prescribe in which senses actual work done within their conceptual frameworks may *possibly* be said to explain, explicate etc., behavior, i.e., prescribe the kind of questions which may legitimately be asked in the conceptual frameworks of PS and BS. The *kind* of answer which may be given to these questions will determine in what sense BS and PS may be said to be models.

■ *Source*: Address read at the Sixth Conference of The Society for the Advancement of Philosophy in South Africa. Held at Potchefstroom, February 6 - 10, 1961. **Selected Presentation.**

The lack of references in this article is due to the fact that the manuscript was prepared for an oral presentation and does not reflect any failure to acknowledge indebtedness to authors such as, P. C. Dodwell, van Peursen, Winch, Peres, Hesse, Brunsvik, and others. — The Author.

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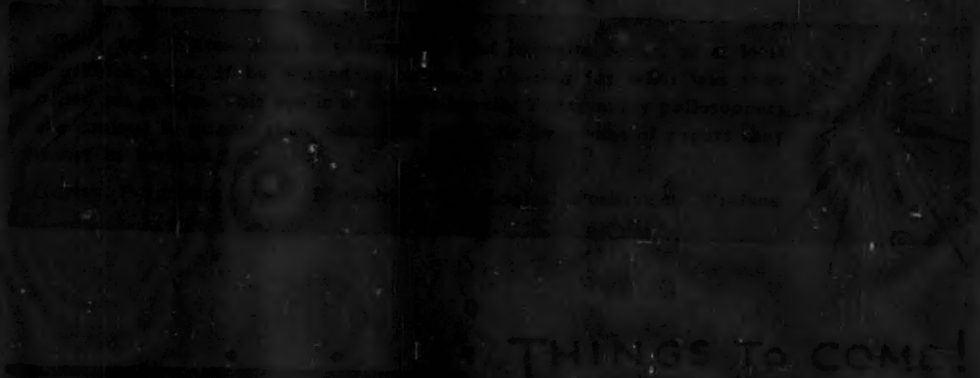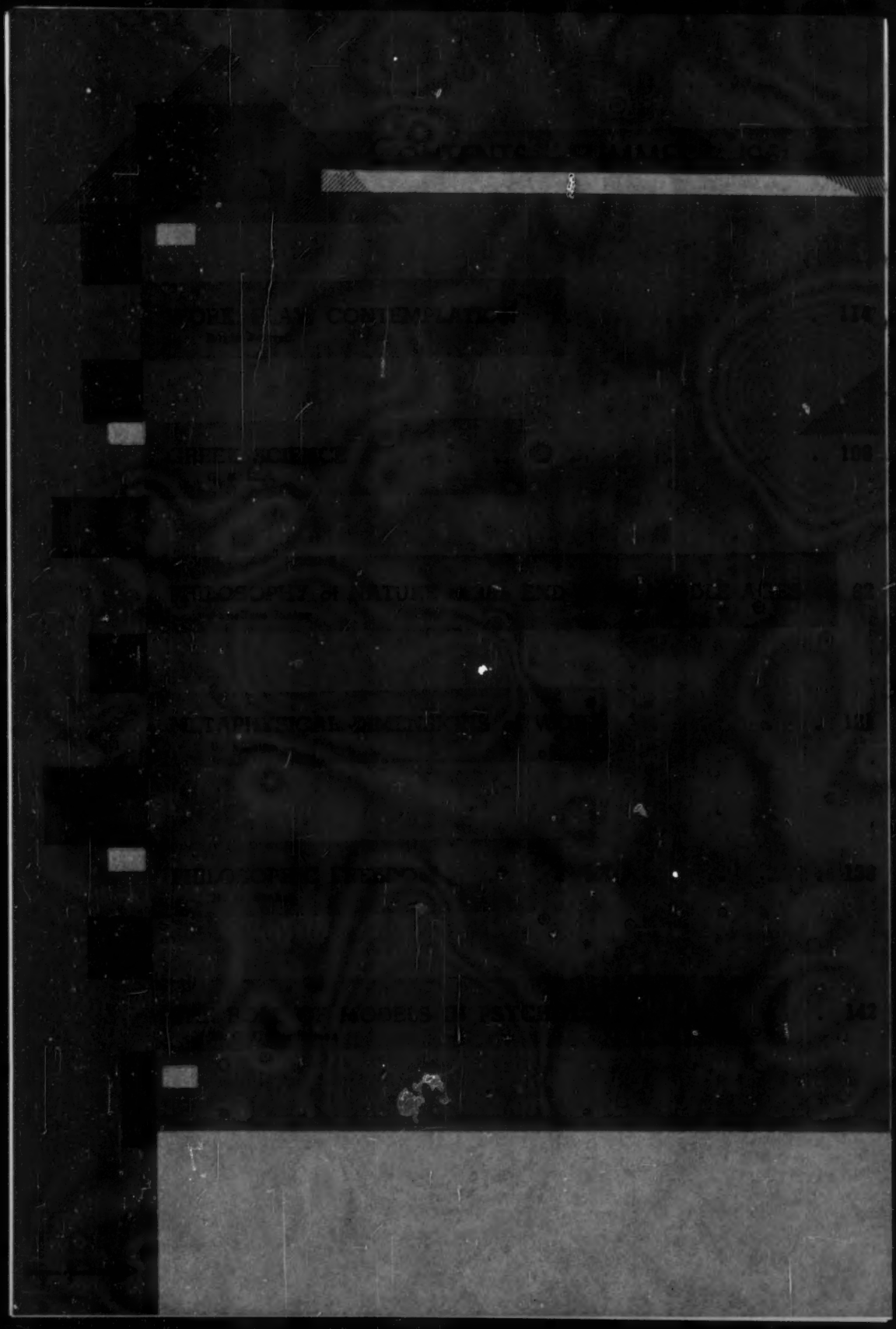
THINGS TO COME!